RTI INTERNATIONAL | Memorandum

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To: Bill Neuffer
EPA/OAQPS/Metals and Minerals Group

From: Katie Hanks

Subject: Cost, Environmental and Energy Impacts for the Proposed Revisions to the NSPS for Non-Metallic Mineral Processing Plants (40 CFR Part 60, subpart OOO)

I. Introduction

To meet the requirements of section 111(b)(1)(B) of the CAA, the Environmental Protection Agency (EPA) is currently conducting the second review the new source performance standards (NSPS) for the non-metallic mineral processing plants (NMPP). The NMPP NSPS was promulgated on August 1, 1985 (40 CFR Part 60 subpart OOO, 50 FR 31328) and subsequently reviewed in 1997. Subpart OOO requires new, modified, or reconstructed affected facilities at NMPP to achieve emission levels that reflect the best demonstrated system of continuous emission reduction, considering cost, non-air quality health, environmental, and energy impacts. These emission levels, referred to as "best demonstrated technology (BDT)," are specified in subpart OOO.

The purpose of this memorandum is to document the methodology used to estimate the cost, environmental, and energy impacts associated with the second NSPS review. The impacts in this memorandum are based on a projected number of new sources (documented in a separate memorandum). As background, Section II of this memorandum summarizes the impacts estimated at promulgation (1985) and for the first (1997) NSPS review. Section III discusses the impacts of the second NSPS review (scheduled for promulgation in 2009), including an overview of the proposed amendments resulting in impacts and the methodology used to develop the impact estimates. Section IV presents an estimate of the number of small businesses impacted, and Section V presents a summary of the impacts estimated for the 2009 NSPS review.

II. Subpart OOO Impacts Estimated at 1985 Promulgation and for the 1997 NSPS Review

New source impacts are considered for the 5 years following promulgation of the standards. The most common control technologies used to comply with subpart OOO include baghouses and wet suppression. Subsections A and B provide a summary of the impacts associated with subpart OOO at promulgation and for the first NSPS review.

A. 1985 Promulgation Impacts

When the NSPS subpart OOO was promulgated, particulate matter (PM) emissions reductions and other impacts were estimated by comparing emissions from affected facilities at

new and expanded plants under the promulgated NSPS standards versus emissions that would have been allowed under State process weight regulations at that time. Baseline emissions (allowed under 1985 state regulations) were estimated to be 50,000 tpy (45,000 Mg/yr).[1] The promulgated NSPS was estimated to reduce the total amount of PM emissions by 45,000 tpy (41,000 Mg/yr), more than a 90 percent reduction in emissions over State process weight regulations at that time.[2]

The water discharge impacts associated with the promulgated NSPS were estimated to be minimal because baghouses have no water discharge and the water from wet suppression systems adheres to the material being processed until it evaporates.[2]

The solid waste impact of the promulgated standards was also determined to be very small. It was estimated that 1.5 tons (1.4 Mg) of solid waste are collected for every 276 tons (250 Mg) of material processed. The collected material can usually be recycled back into the process, sold, or used for other purposes. Where no market exists for the solid material, then the material is typically disposed of in the mine or quarry. No solid waste results from wet suppression techniques.[2]

At the time of promulgation the energy impact was estimated by comparing the energy required for the use of baghouses to the energy required for no control system. The energy impacts attributable to the NSPS were overestimated because: (a) less energy-consuming wet suppression systems could be used in many cases to meet the standards, and (b) some baghouse or wet suppression systems would have been installed to meet State regulations. The energy impact associated with controlling all new NMPP plants constructed by the fifth year was estimated to be 430 terajoules per year. This was estimated to be about a 15 percent increase over the amount of energy that would otherwise be required to meet the industry's projected capacity additions without controls.[2]

Like for the energy impacts, the cost and economic impacts of the 1985 promulgated rule were estimated by comparing the cost of baghouses to use of no control system. The cost impacts attributable to the NSPS were overestimated because: (a) lower cost wet suppression systems could be used in many cases to meet the standards, and (b) some baghouse or wet suppression systems would have been installed to meet State regulations. The cost analysis indicated that the costs associated with NSPS compliance would not preclude construction of most new NMPP, except for the following plant types (which, as a result, were exempted from subpart OOO):

- fixed sand & gravel and crushed stone plants with capacity =25 tph[a]
- portable sand & gravel and crushed stone plants with capacity =150 tph[a]
- pumice and common clay plants with capacity =10 tph[a]

The nationwide capital costs to install baghouses on all new plants were estimated to be $125 million (1979 dollars) for the first 5 years the standards were in effect. The nationwide annualized costs associated with the NSPS were estimated to be $34 million (1979 dollars) in the

did NSPS propose to require installation & use of baghouses?

[a]Capacity is defined in subpart OOO as "the cumulative rated capacity of all initial crushers that are part of the plant." Capacity is provided in tons per hour (tph). The applicability of the NSPS was limited to mineral processing plant exceeding this capacity limit because EPA's cost analysis indicated that the incremental costs associated with baghouse control might preclude construction of new plants processing less than the capacity cutoff.

fifth year. For each mineral industry, the annualized control cost in the fifth year divided by the annual output was less than 2 percent of the price of a ton of product.

B. 1997 NSPS Review Impacts

The NSPS review promulgated in 1997 amended the standards to: (a) reduce or eliminate several of the original rule's paperwork requirements, reducing the costs of emission testing without sacrificing air quality; (b) provide a table specifying the applicability of subpart A (General Provisions for part 60) to subpart OOO affected facilities; and to (c) clarify that facilities located in underground mines are not subject to the NSPS. The 1997 review did not result in increased environmental or cost impacts. Decreased testing and monitoring, reporting, and recordkeeping (MRR) costs were accounted for as part of the Paperwork Reduction Act information collection request (ICR). (*See* 62 FR 31358, June 9, 1997 for details).

III. Subpart OOO Impacts Estimated for 2009 Promulgation of NSPS Review

A. Overview of Proposed Amendments for 2009 and Associated Impacts

The current subpart OOO NSPS review is scheduled to be promulgated in early 2009. The impacts of concern for the NSPS review are incremental impacts, specifically the difference in impacts associated with the current NSPS (as promulgated and reviewed in 1997) and the impacts associated with any changes in NSPS requirements resulting from the 2009 NSPS review. The impacts are determined over a period of five years following promulgation of the 2009 NSPS revisions. Thus, the affected facilities of concern are those installed from 2009 to 2013. The methodology used to project the number of affected facilities (model plants) installed in this time frame is presented in a separate memorandum.[3] Baseline represents the impacts associated with application of the current NSPS at the model plants installed between 2009 and 2013. The incremental impacts of the 2009 NSPS review are determined by comparison to the baseline impacts. Changes in requirements being proposed as part of the 2009 NSPS review that could result in significant incremental impacts include those summarized in Table 1.

Table 1. Summary of proposed changes to subpart OOO and type of incremental impacts.

Proposed rule change	Type of Incremental Impact
? A reduction in the PM stack emission limit from 0.022 gr/dscf to one of two regulatory options (0.014 gr/dscf or 0.010 gr/dscf).	No change in cost, environmental or energy impact for reasons discussed below. *Potential* emission reductions were estimated.
? Omission of stack opacity limit for future affected facilities	Reduced testing cost
? A reduction in the fugitive opacity limits from 15% for crushers and 10% for other affected facilities to 12% for crushers and 7% for other affected facilities.	No change in cost, environmental or energy impact for reasons discussed below. *Potential* emission reductions are not quantifiable.
? A reduction in the duration of Method 9 performance testing from 1-3 hours to 30 minutes	Reduced testing cost
? Add monthly inspection that water is flowing for future affected facilities with water sprays	Increased MRR cost and *potential* emission reductions associated with shorter duration that excess emissions could occur before being noticed.
? Add repeat Method 9 test every 5 years for future affected facilities without water sprays (e.g., fugitive affected facilities with water carryover, partial enclosure, etc.)	Increased testing cost (occurs after 5-year period upon which impacts are estimated)
? Add baghouse monitoring requirement for future affected facilities to conduct quarterly 30-minute Method 22 VE observation. OR ? Allow bag leak detectors as an option in lieu of M22 periodic monitoring.	Increased MRR cost and *potential* emission reductions associated with shorter duration that excess emissions could occur before being noticed.
? Omit §60.7(a)(1) notification of commencement of construction/reconstruction	Reduced MRR cost

The proposed changes in emission limits are not associated with any change in the current control technologies being employed by NMPP. The changes in emission limits simply reflect the demonstrated performance of the majority of control technologies being used. A separate memorandum presents emissions test data showing that most of the current technologies are capable of achieving the regulatory options under consideration for the NSPS review.[4] The same control systems installed on future affected facilities should be capable of meeting the regulatory options. While most of the controls for which emissions test data are available easily meet the current NSPS limits, there were a relatively small percentage that did not meet the limits (but later met the limits through a retest, presumably after maintenance was performed) or met the limits with only a small compliance margin. These units are considered to have "marginal" performance.[4] The purpose of lowering the emission limits through the NSPS review is to ensure that NMPP do not choose to install new control systems with only "marginal" performance when most control systems are capable of far better performance. Because so many of the current control systems meet the NSPS limits and regulatory options with a substantial compliance margin no additional control cost or actual emission reduction is anticipated. The "potential" emission reduction associated with lowering the stack concentration limit was estimated for two regulatory options (0.014 and 0.010 gr/dscf). These potential emission reductions are overestimated because the majority of control systems installed on future affected facilities would likely have resulted in emissions at or below the proposed emission limits even in the absence of the proposed revisions to subpart OOO. Also, because no change in control

technology is anticipated, there are no incremental solid waste, water discharge, or energy impacts associated with the 2009 NSPS review.

Unlike for the proposed changes in emission limits, there would be incremental costs associated with some of the changes to the subpart OOO testing and notification, monitoring, reporting, and recordkeeping (MRR) requirements. Some of the proposed changes would result in decreased incremental costs while others would result in increased incremental costs. "Potential" emissions reductions due to the shortened duration that excess emissions could occur before being corrected under the proposed testing and monitoring revisions were estimated. A number of testing and monitoring options were analyzed for fugitive and stack affected facilities. These options are presented in Attachment 1. Subsections B through E below describe the methodology for estimating impacts of 2009 NSPS review regulatory options.

B. Selection of model plants

Typical sized model plants from the proposal BID were used to provide an estimate of the process air flow volume requiring controls. The model plants provide a link between plant throughput (in tph) and the volumetric air flow that requires treatment to meet the NSPS limits. Model plant operating hours were used to convert annual production rates in tons per year (tpy) to tons per hour (tph).[1] The memo documenting new source projections describes the model sizes and operating hours used for each mineral industry.[3]

Two basic model plants were used in development of the NSPS: Model 1 and Model 2. Model 1 includes primary, secondary, and tertiary crushers, 3-4 screening operations, 5-10 transfer points, and a storage bin loading operation. Model 2 includes the same equipment as Model 1 plus an additional grinding mill and bagging machine. For the impacts analysis done at NSPS promulgation, different mineral types were associated with either Model 1 or Model 2. Next, for each basic model type, different plant sizes were considered. The model types and sizes used for the NSPS review impacts analyses are generally the same as the models used for impacts analysis for the promulgated NSPS (unless otherwise noted in Reference 3).

Depending on the plant size and mineral type, the Model 2 plants are based on 9 to 12 emission streams (of varying air flow rate) from different types of affected facilities.[5] According to the models, these affected facility emission streams would be combined and routed to one to three baghouses. The total air flow controlled by the baghouses is the same as the total air flow from the 9 to 12 emission streams. However, while NMPP do combine and control emissions from various types of affected facilities with a single baghouse in some cases, we are aware from our recent review of air permits that NMPP can also use many smaller baghouses at subpart OOO affected facilities throughout the plant instead of only one to three baghouses. The baghouse configuration has no effect for some impact estimates but could have a significant effect on the cost impacts associated with ongoing testing and monitoring of future baghouses. Therefore, we assumed 9 to 12 baghouses (as opposed to 1 to 3 baghouses) for purposes of estimating testing and monitoring costs.

Table 2 summarizes the models, number of new model plants projected, and the most typical type of control system, and the number of emission points (used for estimating testing/monitoring costs).

Table 2. Projected Model Plants for NSPS Review[a]

Mineral type	Model type	Model plant tph	Model plant hr/yr	Projected number of new model plants	Typical control systems	Number of emission points (used for testing/monitoring cost estimates)
Crushed and Broken Stone	1	300	2,000	96	Wet suppression	22 fugitive emission points[b]
Sand and Gravel Construction Industrial	1	 300 150	 2,000 2,000	 208 1	Wet suppression	22 fugitive emission points[b]
Clays Bentonite Fuller's Earth Ball Clay	2	25	8,400	 1 (Bentonite) 4 (F.E.) 1 (Ball clay)	Baghouse	9 stacks
Gypsum	2	25	8,400	7	Baghouse	9 stacks
Rock Salt and sodium chloride	2	25	8,400	1	Baghouse	9 stacks
Sodium Carbonate	2	300	8,400	1	Baghouse	12 stacks
Pumice	2	25	8,400	2	Baghouse	9 stacks
Barite	2	10	8,400	8	Baghouse	9 stacks
Fluorospar	2	10	5,500	1	Baghouse	9 stacks
Mica	2	10	8,400	1	Baghouse	9 stacks

[a]No new model plants are projected in the 5 years following promulgation of the NSPS review for the following mineral types: kaolin, fire clay, common clay, sodium sulfate, gilsonite, talc/pyrophyllite, boron (including borax, kernite, and colemanite), feldspar, diatomite, perlite, vermiculite, or kyanite (including andalusite, sillimanite, topaz, and dumortierite).

[b]Ten of the 22 fugitive emission points are estimated to be controlled by wet suppression water sprays (at the inlet and outlet of each crusher and at screens) while the remaining 12 fugitive emission points (transfer points and storage bin loading operations) are estimated to be controlled by water carryover or other means.

C. Baseline

Many States incorporate subpart OOO by reference into their State regulations and impose limits that are no more stringent than subpart OOO.[6] Therefore, the baseline emission limits for purposes of estimating the NSPS review impacts were determined to be the current subpart OOO emission limits (i.e., 0.022 gr/dscf).

We conducted a review of state permits (including selected general permits, minor source permits, and title V permits from each state) to determine whether States typically impose testing and monitoring requirements more stringent than subpart OOO, and if so, whether these state

requirements would serve as a baseline for determining the impacts associated with the testing and monitoring options under consideration. Attachment 2 summarizes our findings from this permit review. Many of the permits we reviewed did not contain any testing or monitoring beyond what the current NSPS requires. If additional testing or monitoring was required, it was most often found in minor source or title V permits (but was uncommon in general permits). A number of minor source permits also lacked ongoing testing/monitoring requirements. Many crushed stone or sand & gravel plants (the nonmetallic mineral sectors for which the majority of new model plants are projected) operate under general or minor source permits. Therefore, we concluded based on our permit review that the current subpart OOO requirements were the most likely baseline for testing/monitoring.

D. Testing and MRR cost estimates

Algorithms were developed to estimate the testing, monitoring, notification, reporting, and recordkeeping costs associated with baseline and various testing and monitoring options under the NSPS review. The algorithms considered costs separately for each mineral type with projected new model plants. Key cost inputs to the algorithms are discussed in the following paragraphs.

Labor rates. Labor rates were taken from the Bureau of Labor Statistics, *Table 2. Employer costs per hour worked for employee compensation and costs as a percent of total compensation: Civilian workers, by occupational and industry group*, September 2007 (http://www.bls.gov/news.release/ecec.t02.htm). These labor rates were multiplied by 110 percent to account for overhead and benefit packages as is customary for estimating reporting and recordkeeping burden in supporting statements developed pursuant to the Paperwork Reduction Act. The resultant labor rates were: $108.95 (management), $94.04 (technical), $46.47 (clerical). A weighted labor rate of $104.13 (professional labor + 5% of rate for management labor + 10% for clerical labor) was used for the reporting and recordkeeping cost estimates (similar to how estimates are done in the supporting statement).

Emissions testing cost. Method 5 and Method 9 emissions testing is often done by an outside contractor such that the cost of the emissions testing is a capital cost. The capital cost associated with testing was annualized assuming a 7 percent interest rate and 5-year life (i.e., capital recovery factor [CRF] of 0.244). To calculate annualized costs, the CRF was multiplied by the capital cost of testing. A test cost of $7,000 was used for Method 5 tests. Three-hour Method 9 tests were assigned a cost of $1300. The cost of Method 9 tests lasting less than three hours was based on the ratio of testing time with the 3-hour Method cost (i.e., $433 for a 1-hour Method 9 and $216.67 for a 30-minute Method 9) since labor is the bulk of the Method 9 testing cost.

Monitoring/inspection cost. The cost of periodic checks that water is flowing to water spray nozzles in wet suppression systems was estimated to be $16 per check per water spray location (10 minutes x technical $/hr). The cost of periodic 30-minute Method 22 observations of baghouse stacks was estimated to be $94.04 per observation per baghouse (1 hr x technical $/hr), including time to locate the baghouse, conduct the Method 22 readings, and complete field documentation. Additional recordkeeping burden was estimated for recording/filing the results

of water flow checks (0.1 hr x weighted labor rate $/hr per water spray check) and for Method 22 readings (0.2 hr x weighted labor rate $/hr per baghouse Method 22).

Bag leak detectors (BLDs) were considered as an alternative to periodic Method 22 VE observations for baghouses. The EPA CEMS Cost Model (available at http://www.epa.gov/ttn/emc/cem.html) was used to estimate the costs of BLDs. As shown from the CEMS Cost Model output in Attachment 3. The annualized cost (including capital recovery) for BLDs is over $8,500 per baghouse. Since the cost of bag leak detectors is greater than weekly (or less frequent) Method 22 readings, bag leak detectors were not considered further in any of the regulatory options for the NSPS review. However, BLDs could be allowed as an alternative to periodic Method 22 readings.

Notification, reporting, and recordkeeping costs. Notification, reporting and recordkeeping costs were estimated based on the methodology and assumptions used in the supporting statement for subpart OOO.

Summary of testing and MRR costs. The costs per model plant and nationwide costs of various fugitive and stack testing and monitoring scenarios were estimated. Attachment 1 summarizes the testing and MRR costs associated with various options. The overall impacts associated with the selected option are summarized in Section V of this memorandum. Testing and MRR costs were estimated for years 1-5 following promulgation of the revised NSPS and for years 6 and later. Although not considered as part of the impacts for the NSPS review, the year 6+ costs were included because they reflect the costs associated with 5-year repeat emissions tests. The year 6+ costs are useful for informing decisions regarding ongoing testing requirements.

E. Potential PM and $PM_{2.5}$ emissions reductions

The potential emission reductions are associated with lowering the stack emission limit and with increased testing and monitoring (based on potential excess emissions from malfunctioning controls in the absence of the increased testing and monitoring). "Potential" emission reductions reflect an estimate of the emission reduction that could be gained from the proposed changes to subpart OOO that will ensure that the better performing control systems of today are installed and properly maintained for future affected facilities.

Potential PM reduction from more stringent emission limits. The potential emission reductions associated with reduced fugitive opacity limits (i.e., from 15% to 12% for fugitive crushers, and from 10% to 7% for other fugitive affected facilities) are not readily quantifiable.

To estimate the potential PM reduction associated with lowering the subpart OOO stack emission limit, the gas flow rates and operating hours for each model plant were multiplied by the applicable PM gr/dscf limit using the equation below to arrive at the PM tpy associated with baseline (the current NSPS limit of 0.022 gr/dscf) and each regulatory option (0.014 or 0.010 gr/dscf).

PM tpy = [Limit gr/dscf] X [model total gas flow (cfm)] X [60 min/hr] / [7000 gr/lb] / [2000 lb/ton] X [model hr/yr]

Next, the projected number of model plants to be installed from 2009 to 2013 was multiplied by the PM tpy for each model to arrive at a PM tpy for each mineral. Finally, the PM tpy emissions and reductions for each mineral type were summed to arrive at nationwide estimates. Table 3 summarizes the potential emission reductions associated with lowering the emission limits to either of the regulatory options.

Table 3. Summary of Nationwide Air Impacts for Subpart OOO

Mineral type[a]	No. new model plants	Baseline emissions (at 0.022 gr/dscf) for new models (tpy)	Nationwide emission reduction (tpy) for regulatory options... 0.014 gr/dscf	0.010 gr/dscf
Crushed & Broken stone	96	unquantified	unquantified	unquantified
Sand & Gravel:				
Construction	208	unquantified	unquantified	unquantified
Industrial	1	unquantified	unquantified	unquantified
Clays:				
Bentonite	1	13	5	7
Fuller's earth	4	51	19	28
Ball Clay	1	13	5	7
Rock Salt/Sodium Chloride	1	13	5	7
Gypsum	7	90	33	49
Sodium Carbonate	1	56	20	30
Pumice	2	26	9	14
Barite	8	90	33	49
Fluorspar	1	7	3	4
Mica	1	11	4	6
Total	332	370 tpy (335 Mg/yr)	134 tpy (122 Mg/yr)	202 tpy (183 Mg/yr)

[a]No new model plants are projected in the 5 years following promulgation of the NSPS review for the following mineral types: kaolin, fire clay, common clay, sodium sulfate, gilsonite, talc/pyrophyllite, boron (including borax, kernite, and colemanite), feldspar, diatomite, perlite, vermiculite, or kyanite (including andalusite, sillimanite, topaz, and dumortierite).

Potential PM reduction from testing/monitoring. Potential PM reductions associated with the testing and MRR requirements were estimated differently according to whether the model plant was based on fugitive or stack affected facilities. For both fugitive and stack affected facilities, at baseline NSPS requirements, it was assumed that it would take 1 year for control system problems such as broken bags or plugged wet suppression spray nozzles to be detected. Although theoretically problems could take longer to be discovered since no repeat testing or monitoring is required in the current subpart OOO, it was assumed that problems would be detected through annual control device maintenance or an annual inspection (conducted by either plant personnel or a regulatory agency). It was also assumed that 5 percent of equipment would

experience problems leading to excess emissions (although theoretically all equipment could have excess emissions from time to time).[b]

The potential PM reductions for fugitive affected facilities (i.e., in the crushed stone and construction/industrial sand & gravel sectors) were based on an 80 percent control efficiency for fugitive control measures that are working properly versus 20 percent control efficiency for fugitive control measures that are malfunctioning (e.g., some of the spray nozzles plugged). The 80 percent control efficiency was based on information available in AP-42 section 11.19 construction aggregate processing (e.g., comparison of PM emission factors for controlled and uncontrolled affected facilities in Table 11.19.2-1; and the 70 to 95 percent wet suppression control estimate on p. 11.19.1-5). Emission factors from AP-42 Table 11.19.2-2 were used to estimate uncontrolled emissions from Model Plant 1 as shown in Table 4. The resultant total uncontrolled emission rate is 0.1402 lb/ton (21 tph for a 150 tph plant, and 42 lb/hr for a 300 tph plant). For the potential PM reductions associated with monitoring of fugitive emissions, the incremental emissions reduction was calculated based on the difference in 1 year (baseline) of potential excess emissions experienced by 5 percent of equipment and the time period excess emissions that could occur under the NSPS review options (e.g., 1 year to catch problems at baseline versus monthly under the NSPS review when monthly checks of water flow are required).

Table 4. Estimated Uncontrolled Fugitive Emissions for Model Plant 1

Unit type with AP-42 factor	No. units for Model 1	AP-42 uncontrolled emission factors, lb/ton total PM	Model 1 total PM, lb/ton
Primary crushing	1	0.0024[a]	0.0024
Secondary crushing	1	0.0024[a]	0.0024
Tertiary crushing	1	0.0054	0.0054
Screening	4	0.025	0.1
Fines screening	NA	0.3	0
Fines crushing	NA	0.039	0
Conveying	10	0.003	0.03
TOTAL			0.1402

[a] Footnote in 8/04 version of AP-42 says PM10 for tertiary crushers can be used as upper limit for primary and secondary crushing

The potential PM reductions for stack affected facilities were based on excess emissions that could occur if baghouses malfunction (e.g., have a torn bag). Emissions data indicate that NMPP baghouses with torn bags could be expected to have emissions on the order of 0.04 gr/dscf (if not greater).[4] Therefore, potential excess emissions were estimated as the difference between 0.04 gr/dscf and 0.014 gr/dscf (the regulatory option selected for the proposed NSPS review). The incremental emissions reduction associated with monitoring of stack emissions was calculated based on the difference in 1 year (baseline) of potential excess emissions at 5

[b] In the algorithms used for estimating subpart OOO impacts, an assumption that 5 percent of equipment experiences excess emissions is mathematically equivalent to an assumption that all equipment has excess emissions 5 percent of the time.

percent of equipment and the time period excess emissions that could occur under the NSPS review options (e.g., 1 year to detect problems at baseline versus quarterly under the NSPS review when quarterly 30-minute Method 22 readings are performed).

Potential $PM_{2.5}$ reduction. The fraction of PM emissions that is $PM_{2.5}$ varies depending on mineral type, affected facility, and the control system used. An estimate of $PM_{2.5}$ was based on limited information from the 1982 Background Information Document (BID) and AP-42. Table 2.5 of the 1982 BID contains some particle size data for a few mineral and affected facility types. Based on the information in BID Table 2.5 and AP-42 (i.e., the ratio of $PM_{2.5}$ to total PM emission factors), it appears that 5 percent $PM_{2.5}$ is a reasonable estimate for the crushed and broken stone sector. Zero percent was assumed for gypsum because BID Table 2.5 indicated 0 percent $PM_{2.5}$ for one gypsum process and no additional $PM_{2.5}$ relevant data were available in AP-42. A $PM_{2.5}$ fraction of 20 percent was used as a ballpark for clays based on the range of data in BID Table 2.5 (3 to 65 percent PM less than 2 microns) and in AP-42 for pulverized minerals. The clay section of AP-42 provided no relevant information. The $PM_{2.5}$ data in hand are extremely limited so the fraction of $PM_{2.5}$ should be viewed as only a rough ballpark. The overall nationwide fraction of total PM that is $PM_{2.5}$ was estimated to be six percent based on the relative emission reductions for each mineral type.

IV. Number of Small Businesses Impacted by the 2009 NSPS Review

Small business size standards from the U.S. Small Business Administration (http://www.sba.gov/idc/groups/public/documents/sba_homepage/serv_sstd_tablepdf.pdf) indicate that firms (i.e., individual plants or corporations) with less than 500 employees are considered to be small businesses for the mineral types with projected new model plants. The percentage of firms with less than 500 employees (for a given NAICS) was obtained from "Statistics from the U.S. Census Bureau, Statistics of U.S. Businesses 2005" (http://www.census.gov/epcd/susb/latest/us/US21.HTM and http://www.census.gov/epcd/susb/latest/us/US31.HTM). This information was used to project the number of new model plants that may be small businesses assuming that each small business owns a single affected plant, as shown in Table 5. Based on the percentages of firms with less than 500 employees, it is estimated that up to 318 of the 332 projected new model plants (96 percent) could be small businesses.

Table 5. Projected number of new model plants that could be small businesses.

Mineral type	No. new model plants	Estimated number of small businesses	Percent of firms with less than SBA 500 employees	NAICS
Crushed & Broken stone	96	92	95.7%	21231
Sand & Gravel:	0			
Construction	208	202	97.3%	212321
Industrial	1	1	87.5%	212322
Clays:	0			
Bentonite	1	1	82.9%	212325
Fuller's earth	4	3	82.9%	212325
Ball Clay	1	1	73.9%	212324
Rock Salt/Sodium Chloride	1	1	78.4%	212393
Gypsum	7	6	92.3%	212399
Sodium Carbonate	1	1	50.0%	212391
Pumice	2	2	92.3%	212399
Barite	8	6	78.4%	212393
Fluorspar	1	1	78.4%	212393
Mica	1	1	92.3%	212399
Total	**332**	**318 (96% of model plants)**		

[a]No new model plants are projected in the 5 years following promulgation of the NSPS review for the following mineral types: kaolin, fire clay, common clay, sodium sulfate, gilsonite, talc/pyrophyllite, boron (including borax, kernite, and colemanite), feldspar, diatomite, perlite, vermiculite, or kyanite (including andalusite, sillimanite, topaz, and dumortierite).

V. Summary of Impacts Associated with the 2009 NSPS Review

Table 6 summarizes the nationwide incremental cost impacts, potential incremental PM and $PM_{2.5}$ emission reductions, and number of small businesses associated with the 2009 NSPS review. The methodology used to arrive at these incremental impact estimates is presented in this memorandum. The impacts shown in Table 6 are based on the following regulatory options selected for inclusion in the 2009 NSPS review:

- Stack PM concentration limit of 0.014 gr/dscf
- Omission of the 7% stack opacity limit
- Revised fugitive emission limits of 12% for crushers and 7% for other fugitive affected facilities
- Reduced Method 9 test duration for fugitive affected facilities (reduced to 30 minutes)
- Added monthly inspection that water is flowing for future affected facilities with water sprays
- Added repeat Method 9 testing every 5 years for future affected facilities without water sprays (e.g., fugitive affected facilities with water carryover, partial enclosure, etc.)
- Added quarterly 30-minute Method 22 VE observations for baghouses
- Omission of §60.7(a)(1) notification of commencement of construction/reconstruction

Table 6. Summary of Nationwide Cost and Air Impacts for the Proposed Subpart OOO NSPS Revisions

Mineral type[a]	No. new model plants	Est. of small businesses[b]	Total *potential* PM emission reduction[c], tpy	Percent $PM_{2.5}$[d]	*Potential* $PM_{2.5}$ emission reduction[c], tpy	Incremental capital cost[e], $	Incremental annualized cost, $/yr	Incremental annualized cost per plant, $/yr
Crushed & Broken stone	96	92	111	5	6	(457,600)	187,860	1,957
Sand & Gravel:								
Construction	208	202	241	5	12	(991,467)	407,029	1,957
Industrial	1	1	1	5	0.03	(4,767)	1,957	1,957
Clays:								
Bentonite	1	1	5	20	1	(11,700)	1,270	1,270
Fuller's earth	4	3	21	20	4	(46,800)	5,080	1,270
Ball Clay	1	1	5	20	1	(11,700)	1,270	1,270
Rock Salt/Sodium Chloride	1	1	5	5	0.3	(11,700)	1,270	1,270
Gypsum	7	6	37	-	-	(81,900)	8,889	1,270
Sodium Carbonate	1	1	23	5	1	(15,600)	1,697	1,697
Pumice	2	2	10	5	1	(23,400)	2,540	1,270
Barite	8	6	37	5	2	(93,600)	10,159	1,270
Fluorspar	1	1	3	5	0.2	(11,700)	1,270	1,270
Mica	1	1	5	5	0.2	(11,700)	1,270	1,270
Total	**332**	**318 (96%)**	**503 tpy 456 Mg/yr**		**28 tpy 25 Mg/yr (6% of total PM)**	**(1,773,633)**	**631,560**	**1,902**

[a]No new model plants are projected in the 5 years following promulgation of the NSPS review for the following mineral types: kaolin, fire clay, common clay, sodium sulfate, gilsonite, talc/pyrophyllite, boron (including borax, kernite, and colemanite), feldspar, diatomite, perlite, vermiculite, or kyanite (including andalusite, sillimanite, topaz, and dumortierite).

[b]Based on U.S. Census Bureau, Statistics of U.S. Businesses 2005 (http://www.census.gov/epcd/susb/latest/us/US21.HTM). Assumes that each small business owns a single affected plant.

[c]Includes *potential* emission reduction associated with lowering the stack emission limit from 0.022 gr/dscf to 0.014 gr/dscf and the *potential* emission reduction associated with increased testing and monitoring (based on potential emissions from malfunctioning controls). *Potential* reductions may be overstated because most baseline control devices already perform at 0.014 gr/dscf (such that no additional emission reduction would be gained from lowering the limits to 0.014 gr/dscf).

[d]The split between PM and $PM_{2.5}$ varies depending on mineral, process, and control system used. The percent $PM_{2.5}$ is a ballpark figure based on the limited available information in AP-42 and the 1982 BID.

[e]No additional cost is required for control equipment. The incremental cost differences are associated with changes in the MRR requirements. There is a negative capital cost because the revised NSPS would reduce costs of initial testing requirements by (a) allowing a 30-minute Method 9 test instead of a 1-hour test for fugitive affected facilities; and (b) by omitting the 7% stack opacity limit and associated initial testing from subpart OOO.

References:

1. U.S. EPA, OAQPS, *Nonmetallic Mineral Processing Plants – Background Information for Proposed Standards*, EPA-450/3-83-001a. April 1983. pp. 6-2, 6-7, 7-5, and 8-54.

2. Standards of Performance for New Stationary Sources; Nonmetallic Mineral Processing Plants; Final Rule. August 1, 1985. 50 FR 31328.

3. Memorandum from Katie Hanks and Melissa Icenhour, RTI International, to Bill Neuffer, EPA/OAQPS. February 11, 2008. New Source Projections for the Proposed Revisions to the NSPS for Non-Metallic Mineral Processing Plants (40 CFR Part 60, subpart OOO)

4. Memorandum from Katie Hanks, RTI International, to Bill Neuffer, EPA/OAQPS. March 14, 2008. Summary of Emissions Test Data Used in Review of the Non-Metallic Mineral Processing NSPS (40 CFR Part 60, subpart OOO).

5. U.S. EPA, OAQPS, Air *Pollution Control Techniques for Non-Metallic Minerals Industry*, EPA-450/3-82-014. August 1982. pp. 4-1 to 4-7.

6. Memorandum from Katie Hanks, RTI International, to Bill Neuffer, EPA/OAQPS. September 28, 2007. Summary of State Permit Requirements and Facility List for Non-Metallic Mineral Processing Plants Subject to NSPS (40 CFR Part 60, subpart OOO).

Attachment 1

Cost Impacts of Various Testing and Monitoring Options

Attachment 1A: Selected Scenario Summary and Detailed Algorithm Sheets

Attachment 1B: Summaries of Other Testing/Monitoring Options Considered

Attachment 1A: Selected Scenario Summary and Detailed Algorithm Sheets

Fugitive Testing: Initial M9
Fugitive Monitoring: Monthly water flow check for water sprays.
Repeat (every 5 yrs) M9 for affected facilities with carryover/other fugitive control

Stack Testing: Initial M5. Omit M8.
Stack (BH) Monitoring: Quarterly 30-min M22.

SCENARIO: **Selected scenario**

Summary of Nationwide Testing, Monitoring, Reporting, and Recordkeeping Costs for Subpart OOO (Years 1-5)

Mineral type	No. new model plants	Baseline capital cost	Baseline annualized cost	Post-revision capital cost	Post-revision annualized cost	Difference in capital cost	Difference in annualized cost	Potential emission reduction,* tpy	Potential cost effectiveness ($/ton)	Difference in annualized cost per plant
Crushed & Broken stone	96	$ 915,200	$ 328,275	$ 457,600	$ 516,134	$ (457,600)	$ 187,860	111	$ 1,692	$ 1,957
Sand & Gravel:										
Construction	208	$ 1,982,933	$ 711,262	$ 991,467	$ 1,118,291	$ (991,467)	$ 407,029	241	$ 1,692	$ 1,957
Industrial	1	$ 9,533	$ 3,420	$ 4,767	$ 5,376	$ (4,767)	$ 1,957	1	$ 3,384	$ 1,957
Clays:										
Kaolin	None									
Fireclay	None									
Bentonite	1	$ 74,700	$ 19,320	$ 63,000	$ 20,590	$ (11,700)	$ 1,270	1	$ 2,233	$ 1,270
Fuller's earth	4	$ 298,800	$ 77,281	$ 252,000	$ 82,360	$ (46,800)	$ 5,080	2	$ 2,233	$ 1,270
Ball Clay	1	$ 74,700	$ 19,320	$ 63,000	$ 20,590	$ (11,700)	$ 1,270	1	$ 2,233	$ 1,270
Common Clay	None									
Rock Salt/Sodium Chloride	1	$ 74,700	$ 19,320	$ 63,000	$ 20,590	$ (11,700)	$ 1,270	1	$ 2,233	$ 1,270
Gypsum	7	$ 522,900	$ 135,241	$ 441,000	$ 144,131	$ (81,900)	$ 8,889	4	$ 2,233	$ 1,270
Sodium Carbonate	1	$ 99,600	$ 25,396	$ 84,000	$ 27,092	$ (15,600)	$ 1,697	2	$ 685	$ 1,697
Sodium sulfate	None									
Pumice	2	$ 149,400	$ 38,640	$ 126,000	$ 41,180	$ (23,400)	$ 2,540	1	$ 2,233	$ 1,270
Gilsonite	None									
Talc and Pyrophyllite	None									
Boron	None									
Barite	8	$ 597,600	$ 154,562	$ 504,000	$ 164,721	$ (93,600)	$ 10,159	4	$ 2,548	$ 1,270
Fluorspar	1	$ 74,700	$ 19,320	$ 63,000	$ 20,590	$ (11,700)	$ 1,270	0	$ 3,891	$ 1,270
Feldspar	None									
Diatomite	None									
Perlite	None									
Vermiculite	None									
Mica	1	$ 74,700	$ 19,320	$ 63,000	$ 20,590	$ (11,700)	$ 1,270	0	$ 2,548	$ 1,270
Kyanite	None									
Total	332	$ 4,949,467	$ 1,570,678	$ 3,175,833	$ 2,202,237	$ (1,773,633)	$ 631,560	369	$ 1,713	$ 1,902
								334 Mg/yr	1889 $/Mg	

*Potential emission reduction associated with increased testing and monitoring (based on potential emissions from malfunctioning controls)

Summary of Nationwide Testing, Monitoring, Reporting, and Recordkeeping Costs for Subpart OOO (Year 6+)

Mineral type	No. new model plants	Baseline capital cost	Baseline annualized cost	Post-revision capital cost	Post-revision annualized cost	Difference in capital cost	Difference in annualized cost	Potential emission reduction,* tpy	Potential cost effectiveness ($/ton)	Difference in annualized cost per plant
Crushed & Broken stone	96	-	14,995	249,600	443,389	$ 249,600	$ 428,394	111	$ 3,858	$ 4,462
Sand & Gravel:										
Construction	208	-	32,489	540,800	960,677	$ 540,800	$ 928,166	241	$ 3,858	$ 4,462
Industrial	1	-	156	2,600	4,619	$ 2,600	$ 4,462	1	$ 7,716	$ 4,462
Clays:										
Kaolin	None									
Fireclay	None									
Bentonite	1	-	156	-	4,291	$ -	$ 4,135	1	$ 7,272	$ 4,135
Fuller's earth	4	-	625	-	17,165	$ -	$ 16,540	2	$ 7,272	$ 4,135
Ball Clay	1	-	156	-	4,291	$ -	$ 4,135	1	$ 7,272	$ 4,135
Common Clay	None									
Rock Salt/Sodium Chloride	1	-	156	-	4,291	$ -	$ 4,135	1	$ 7,272	$ 4,135
Gypsum	7	-	1,093	-	30,039	$ -	$ 28,946	4	$ 7,272	$ 4,135
Sodium Carbonate	1	-	156	-	5,670	$ -	$ 5,513	2	$ 2,225	$ 5,513
Sodium sulfate	None									
Pumice	2	-	312	-	8,583	$ -	$ 8,270	1	$ 7,272	$ 4,135
Gilsonite	None									
Talc and Pyrophyllite	None									
Boron	None									
Barite	8	-	1,250	-	34,331	$ -	$ 33,081	4	$ 8,296	$ 4,135
Fluorspar	1	-	156	-	4,291	$ -	$ 4,135	0	$ 12,871	$ 4,135
Feldspar	None									
Diatomite	None									
Perlite	None									
Vermiculite	None									
Mica	1	-	156	-	4,291	$ -	$ 4,135	0	$ 8,296	$ 4,135
Kyanite	None									
Total	332	$ -	$ 51,856	$ 793,000	$ 1,526,929	$ 793,000	$ 1,474,071	369	$ 3,999	$ 4,440
								334 Mg/yr	4408 $/Mg	

*Potential emission reduction associated with increased testing and monitoring (based on potential emissions from malfunctioning controls)

Parameter	Value	Note	Reference	
Typical Plant size (tph):	300		p. 8-7 of EPA-450/3-83-001a (April 1983 BID)	
Model Plant No.	1		p. 8-8 of EPA-450/3-83-001a (April 1983 BID)	
Gas flow to baghouses (cfm):	40000		p. 8-2 of EPA-450/3-83-001a (April 1983 BID)	
	8000		However, note that C&B does not typically use BHs. Wet suppression is dominant contro	
Total gas flow	48000			
Model hrs/yr	2000			
PM at 0.022 gr/dscf (tpy)	[redacted]	unquantified		
Air impacts per model:				
PM at 0.015 gr/dscf (tpy)	[redacted]	unquantified		
Em. Red. for 0.015 (tpy)	[redacted]	unquantified		
PM at 0.01 gr/dscf (tpy)	[redacted]	unquantified		
Em. Red. for 0.01 (tpy)	[redacted]	unquantified		
Nationwide air impacts:				
No. of new models projected	[redacted]	unquantified		
N'wide PM at 0.022 gr/dscf (tpy)	[redacted]	unquantified		
N'wide PM at 0.015 gr/dscf (tpy)	[redacted]	unquantified		
N'wide em. red. for 0.015 (tpy)	[redacted]	unquantified		
N'wide PM at 0.01 gr/dscf (tpy)	[redacted]	unquantified		
N'wide em. red. for 0.01 (tpy)	[redacted]	unquantified		
Testing and monitoring costs:				
Total number of fugitive affected facilities to be tested:	22		Model 1 includes:	
No. with wet suppression sprays	10		Primary, secondary, and tertiary crushers (assume 6 water sprays here for inlet/outlet of each crusher	
No. with carryover or other fugitive control	12		3-4 screening operations (assume 4 water sprays)	
			5-10 transfer points (assume carryover/enclosure here for 10 eff. facilities)	
Total number of stacks to be tested:	0		storage bin loading operation (assume carryover for bin and enclosure for loading for 2 eff. facilites	
N'wide **baseline** testing/monitoring cost:			Test cost x no. new plants x no. affected facilities to be tested	
Total Method 9 initial fugitive testing cost	$ 915,200	C	Includes 1-hour tests only	
Total Method 5 initial stack testing cost	$ -	C		
Total Method 9 initial stack testing cost	$ -	C		
Total n'wide baseline testing/mont. cost:				
Capital ($), YRS 1-5	$ 915,200			
Annualized (annual costs + annualized capital), $/yr, YRS 1-5	$ 223,309		CRF at 5 yrs, 7% interest = 0.244	
Capital ($), YR 6+	$ -			
Annualized (annual costs + annualized capital), $/yr, YR 6+	$ -			
N'wide testing/monitoring cost **under revised NSPS**:				
Requirements for fugitive affected facilities				
Total Method 9 initial fugitive testing cost	$ 457,600	C	30-minute tests only	
Total Method 9 repeat fugitive test cost (for wet supp. only)	$ -	C 5 yr		
Check that water flowing for wet suppression sprays	$ 180,553	A	Frequency of water checks (times/yr)=	12
Method 9 for carryover or other fugitive control	$ 249,600	C 5 yr	30-minute tests	0
Requirements for stack affected facilities				
Total Method 5 initial stack testing cost	$ -	C	M5 test cost if 1 repeat test conducted in 5 years after promulgation	
Total Method 9 initial stack testing cost	$ -	C	Method 9 stack opacity limit omitted for new	
Total Method 5 repeat stack test cost	$ -	C 5 yr		
Total Method 9 repeat stack test cost	$ -	C 5 yr	Method 9 stack opacity limit omitted for new	
Periodic visual inspections of BH	$ -	A	Frequency of visual inspections (times/yr) =	0
Periodic 30-minute M22 readings for BH's	$ -	A	Frequency of 30-min M22 (times/yr) =	4
Total n'wide revised testing/mont. cost:				
Capital ($), YRS 1-5	$ 457,600			
Annualized (annual costs + annualized capital), $/yr, YRS 1-5	$ 292,207			
Capital ($), YR 6+	$ 249,600			
Annualized (annual costs + annualized capital), $/yr, YR 6+	$ 241,455			
Difference between baseline & revised NSPS				
Capital ($), YRS 1-5	$ (457,600)		Difference due to omitted M9 for stacks. Does not include 5-yr repeat tests	
Annualized (annual costs + annualized capital), $/yr, YRS 1-5	$ 68,899			
Capital ($), YR 6+	$ 249,600		includes 5-yr repeat test costs	
Annualized (annual costs + annualized capital), $/yr, YR 6+	$ 241,455		includes 5-yr repeat test costs	

N'wide reporting and recordkeeping (R&R) costs:

N'wide **baseline** R&R cost:				
One-time costs:				
Read instructions/rule (1 hr per NMPP)	$	9,997		
Planning/report for initial performance tests (30 hr per NMPP)	$	299,902	60.8(a) - report	
Planning/report for **repeat** performance tests (30 hr per NMPP, 20% fail rate)	$	59,980		
Notification of construction/reconstruction (2 hr per NMPP)	$	19,993	60.7(a)(1)	
Notification of actual startup (2 hr per NMPP)	$	19,993	60.7(a)(3)	
Notification of initial performance test (2 hr per NMPP)	$	19,993	60.8(d)	
Notification of physical or operational change (2 hr per NMPP)	$	19,993	60.7(a)(4)	
Total one-time costs divided by 5 yrs ($/yr) YR 1-5	$	89,971		
Total one-time costs divided by 5 yrs ($/yr) YR 6+	$	-		
Annual costs:				
Records of startups, shutdowns, malfunctions, etc. (1.5 hr per NMPP)	$	14,995	60.7(b)	
Record monitoring data (0 hr/affected facility)	$	-		Wet scrubbers have no parameter recording frequency. Also, models based on BH or wet suppression.
Semiannual wet scrubber monitoring deviation reports	$	-	60.676(d)	Models based on baghouse or wet suppression
Total of one-time costs per year + annual costs ($/yr) YR 1-5	$	104,966		
Total of one-time costs per year + annual costs ($/yr) YR 6+	$	14,995		

N'wide R&R cost **under revised NSPS**:				
One-time costs:				
Read instructions/rule (1 hr per NMPP)	$	9,997		
Planning/report for initial performance tests (30 hr per NMPP)	$	299,902	60.8(a) - report	
Planning/report for repeat performance tests (30 hr per NMPP, 25% fail rate)	$	74,976		Increased fail rate to 25% for revised NSPS since compliance margin is smaller
Planning/report for repeat tests after 6+ yrs	$	299,902		
Planning/report for repeat tests failed after 6+ yrs (5% fail rate)	$	14,995		Used 5% fail rate because few should fail given the ongoing monitoring.
Notification of construction/reconstruction (2 hr per NMPP)	$	-	60.7(a)(1)	Omitted from NSPS revision
Notification of actual startup (2 hr per NMPP)	$	19,993	60.7(a)(3)	
Notification of initial performance test (2 hr per NMPP)	$	19,993	60.8(d)	
Notification of repeat performance test (2 hr per NMPP) after 6+ yrs	$	19,993	60.8(d)	
Notification of physical or operational change (2 hr per NMPP)	$	19,993	60.7(a)(4)	
Total one-time costs divided by 5 yrs ($/yr) YR 1-5	$	88,971		Less than baseline because notification of construction/reconstruction omitted. 5-yr repeat tests not include
Total one-time costs divided by 5 yrs ($/yr) YR 6+	$	88,978		Includes 5-yr repeat tests
Annual costs:				
Records of startups, shutdowns, malfunctions, etc. (1.5 hr per NMPP)	$	14,995	60.7(b)	
Planning/report for annual M9 tests for fugitive points with carryover/other	$	-		16 hr/NMPP with fugitive points to be retested x 1.05 to account for 5% fail rate
Record monitoring data:				
Record water flow checks (0.1 hr/water spray/check)	$	119,961		
Record BH visual inspections (0.5 hr/BH/monitoring event)	$	-		
Record BH M22 readings (0.2 hr/BH/monitoring event)	$	-		
Semiannual wet scrubber monitoring deviation reports	$	-	60.676(d)	Models based on baghouse or wet suppression
Total of one-time costs per year + annual costs ($/yr) YR 1-5	$	223,927		
Total of one-time costs per year + annual costs ($/yr) YR 6+	$	201,934		
Difference in R&R costs, $/yr YR 1-5	$	118,961		
Difference in R&R costs, $/yr YR 6+	$	186,939		

Potential emission reduction from increased testing/monitoring on fugitives

N'wide excess PM from malfunctioning fugitive control, lb/hr		121	0.1402 lb/ton x model tph. Used sum of AP-42 uncontrolled PM factors to get 0.1402. 80% control assumed for functional system and 20% assumed for malfnctioning system
Baseline testing/monitoring:			Percent of equipment malfunctioning = 5%
Hours of excess emissions before noticed (1 yr x hr/yr)		2000	Assume takes 1 yr to detect problem, although could continue for longer since no testing/monitoring in current NSPS
Total excess emissions, tpy		121	
Revised NSPS testing/monitoring:			
Hours of excess emissions before noticed (frequency x hr/yr)		167	Assumes problem would be caught: monthly
Total excess emissions, tpy		10.1	
Emission reduction from increased testing/monitoring, tpy		111	
Cost effectiveness of increased testing/monitoring ($/ton), YRS 1-5	$	820	Difference in annualized cost ($/yr) / Emission reduction (tpy)
Cost effectiveness of increased testing/monitoring ($/ton), YR 6+	$	2,175	

C&B

Parameter	Value	Note	Reference
Typical Plant size (tph):	300		p. 6-7 of EPA-450/3-83-001a (April 1983 BID)
Model Plant No.	1		p. 6-6 of EPA-450/3-83-001a (April 1983 BID)
Gas flow to baghouses (cfm):	40000		p. 6-2 of EPA-450/3-83-001a (April 1983 BID)
			However, note that S&G does not typically use BHs. Wet suppression is dominant control
	6000		
Total gas flow	46000		
Model hr/yr	2000		
PM at 0.022 grdscf (tpy)	[redacted]	unquantified	
Air impacts per model:			
PM at 0.015 grdscf (tpy)	[redacted]	unquantified	
Em. Red. for 0.015 (tpy)	[redacted]	unquantified	
PM at 0.01 grdscf (tpy)	[redacted]	unquantified	
Em. Red. for 0.01 (tpy)	[redacted]	unquantified	
Nationwide air impacts:			
No. of new models projected	[redacted]	unquantified	
N'wide PM at 0.022 grdscf (tpy)	[redacted]	unquantified	
N'wide PM at 0.015 grdscf (tpy)	[redacted]	unquantified	
N'wide em. red. for 0.015 (tpy)	[redacted]	unquantified	
N'wide PM at 0.01 grdscf (tpy)	[redacted]	unquantified	
N'wide em. red. for 0.01 (tpy)	[redacted]	unquantified	
Testing and monitoring costs:			
Total number of fugitive affected facilities to be tested:	22		Model 1 includes: Primary, secondary, and tertiary crushers (assume 6 water sprays here for inlet/outlet of each crusher) 3-4 screening operations (assume 4 water sprays) 6-10 transfer points (assume carryover/enclosure here for 10 aff. facilities) storage bin loading operation (assume carryover for bin and enclosure for loading for 2 aff. facilities)
No. with wet suppression sprays	10		
No. with carryover or other fugitive control	12		
Total number of stacks to be tested:	0		
N'wide **baseline** testing/monitoring cost:			Test cost x no. new plants x no. affected facilities to be tested
Total Method 9 initial fugitive testing cost	$ 1,982,933	C	Includes 1-hour tests only
Total Method 5 initial stack testing cost	$ -	C	
Total Method 9 initial stack testing cost	$ -	C	
Total n'wide baseline testing/mont. cost:			
Capital ($), YRS 1-5	$ 1,982,933		
Annualized (annual costs + annualized capital), $/yr, YRS 1-5	$ 483,836		CRF at 5 yrs, 7% interest = 0.244
Capital ($), YR 6+	$ -		
Annualized (annual costs + annualized capital), $/yr, YR 6+	$ -		
N'wide testing/monitoring cost **under revised NSPS:**			
Requirements for fugitive affected facilities			
Total Method 9 initial fugitive testing cost	$ 991,467	C	30-minute tests
Total Method 9 repeat fugitive test cost (for wet supp. only)	$ -	C 5 yr	
Check that water flowing for wet suppression sprays	$ 361,198	A	Frequency of water checks (times/yr)= 12
Method 9 for carryover or other fugitive contro	$ 540,800	C 5 yr	30-minute tests 0
Requirements for stack affected facilities			
Total Method 5 initial stack testing cost	$ -	C	M5 test cost if 1 repeat test conducted in 5 years after promulgation
Total Method 9 initial stack testing cost	$ -	C	Method 9 stack opacity limit omitted for new
Total Method 5 repeat stack test cost	$ -	C 5 yr	
Total Method 9 repeat stack test cost	$ -	C 5 yr	Method 9 stack opacity limit omitted for new
Periodic visual inspections of BH	$ -	A	Frequency of visual inspections (times/yr) = 0
Periodic 30-minute M22 readings for BH's	$ -	A	Frequency of 30-min M22 (times/yr) = 4
Total n'wide revised testing/mont. cost:			
Capital ($), YRS 1-5	$ 991,467		
Annualized (annual costs + annualized capital), $/yr, YRS 1-5	$ 633,116		
Capital ($), YR 6+	$ 540,800		
Annualized (annual costs + annualized capital), $/yr, YR 6+	$ 523,153		
Difference between baseline & revised NSPS			
Capital ($), YRS 1-5	$ (991,467)		Difference due to omitted M9 for stacks. Does not include 5-yr repeat tests
Annualized (annual costs + annualized capital), $/yr, YRS 1-5	$ 149,280		
Capital ($), YR 6+	$ 540,800		Includes 5-yr repeat test costs
Annualized (annual costs + annualized capital), $/yr, YR 6+	$ 523,153		Includes 5-yr repeat test costs

N'wide reporting and recordkeeping (R&R) costs:

N'wide **baseline** R&R cost:

One-time costs:			
Read instructions/rule (1 hr per NMPP)	$	21,660	
Planning/report for initial performance tests (30 hr per NMPP)	$	649,788	60.8(a) - report
Planning/report for repeat performance tests (30 hr per NMPP, 20% fail r	$	129,958	
Notification of construction/reconstruction (2 hr per NMPP)	$	43,319	60.7(a)(1)
Notification of actual startup (2 hr per NMPP)	$	43,319	60.7(a)(3)
Notification of initial performance test (2 hr per NMPP)	$	43,319	60.8(d)
Notification of physical or operational change (2 hr per NMPP)	$	43,319	60.7(a)(4)
Total one-time costs divided by 5 yrs ($/yr) YR 1-5	$	194,936	
Total one-time costs divided by 5 yrs ($/yr) YR 6+	$	-	
Annual costs:			
Records of startups, shutdowns, malfunctions, etc. (1.5 hr per NMPP)	$	32,489	60.7(b)
Record monitoring data (0 hr/affected facility)	$	-	
Semiannual wet scrubber monitoring deviation reports	$	-	60.676(d)
Total of one-time costs per year + annual costs ($/yr) YR 1-5	$	227,426	
Total of one-time costs per year + annual costs ($/yr) YR 6+	$	32,489	

Wet scrubbers have no parameter recording frequency. Also, models based on BH or wet suppression.
Models based on baghouse or wet suppression

N'wide R&R cost **under revised NSPS**:

One-time costs			
Read instructions/rule (1 hr per NMPP)	$	21,660	
Planning/report for initial performance tests (30 hr per NMPP)	$	649,788	60.8(a) - report
Planning/report for repeat performance tests (30 hr per NMPP, 25% fail r	$	162,447	
Planning/report for repeat tests after 6+ yrs	$	649,788	
Planning/report for repeat tests failed after 6+ yrs (5% fail rate)	$	32,489	
Notification of construction/reconstruction (2 hr per NMPP)	$	-	60.7(a)(1)
Notification of actual startup (2 hr per NMPP)	$	43,319	60.7(a)(3)
Notification of initial performance test (2 hr per NMPP)	$	43,319	60.8(d)
Notification of repeat performance test (2 hr per NMPP) after 6+ yrs	$	43,319	60.8(d)
Notification of physical or operational change (2 hr per NMPP)	$	43,319	60.7(a)(4)
Total one-time costs divided by 5 yrs ($/yr) YR 1-5	$	192,770	
Total one-time costs divided by 5 yrs ($/yr) YR 6+	$	145,119	
Annual costs:			
Records of startups, shutdowns, malfunctions, etc. (1.5 hr per NMPP)	$	32,489	60.7(b)
Planning/report for annual M9 tests for fugitive points with carryover/othe	$	-	
Record monitoring data:			
Record water flow checks (0.1 hr/water spray/check)	$	259,915	
Record BH visual inspections (0.5 hr/BH/monitoring event)	$	-	
Record BH M22 readings (0.2 hr/BH/monitoring event)	$	-	
Semiannual wet scrubber monitoring deviation reports	$	-	60.676(c)
Total of one-time costs per year + annual costs ($/yr) YR 1-5	$	485,175	
Total of one-time costs per year + annual costs ($/yr) YR 6+	$	437,524	
Difference in R&R costs, $/yr YR 1-5	$	257,749	
Difference in R&R costs, $/yr YR 6+	$	406,035	

Less than baseline because notification of construction/reconstruction omitted. 5-yr repeat tests not included
Includes 5-yr repeat tests

16 hr/NMPP with fugitive points to be retested x 1.05 to account for 5% fail rate

Models based on baghouse or wet suppression

Used 5% fail rate because few should fail given the ongoing monitoring.
Omitted from NSPS revision

Potential emission reduction from increased testing/monitoring on fugitives

N'wide excess PM from malfunctioning fugitive control, lb/hr		282
Baseline testing/monitoring:		
Hours of excess emissions before noticed (1 yr x hr/yr)		2000
Total excess emissions, tpy		282
Revised NSPS testing/monitoring:		
Hours of excess emissions before noticed (frequency x hr/yr)		167
Total excess emissions, tpy		21.9
Emission reduction from increased testing/monitoring, tpy		241
Cost effectiveness of increased testing/monitoring ($/ton), YRS 1-5	$	620
Cost effectiveness of increased testing/monitoring ($/ton), YR 6+	$	2,175

0.1402 lb/ton x model tph. Used sum of AP-42 uncontrolled PM factors to get 0.1402.
80% control assumed for functional system and 20% assumed for malfnctioning system
Percent of equipment malfunctioning = 5%
Assume takes 1 yr to detect problem, although could continue for longer since no testing/monitoring in current NSPS

Assumes problem would be caught: monthly

Difference in annualized cost ($/yr) / Emission reduction (tpy).

Parameter	Value	Note	Reference	
Typical Plant size (tph):	150		p. 6-7 of EPA-450/3-83-001a (April 1983 BID)	
Model Plant No.:	1		p. 6-6 of EPA-450/3-83-001a (April 1983 BID)	
Gas flow to baghouses (cfm):	25000		p. 6-2 of EPA-450/3-83-001a (April 1983 BID)	
Total gas flow	25000		However, note that S&G does not typically use BHs. Wet suppression is dominant control	
Model hr/yr	2000			
PM at 0.022 gr/dscf (tpy)	[redacted]	unquantified		
Air impacts per model:				
PM at 0.015 gr/dscf (tpy)	[redacted]	unquantified		
Em. Red. for 0.015 (tpy)	[redacted]	unquantified		
PM at 0.01 gr/dscf (tpy)	[redacted]	unquantified		
Em. Red. for 0.01 (tpy)	[redacted]	unquantified		
Nationwide air impacts:				
No. of new models projected	[redacted]	unquantified		
N'wide PM at 0.022 gr/dscf (tpy)	[redacted]	unquantified		
N'wide PM at 0.015 gr/dscf (tpy)	[redacted]	unquantified		
N'wide em. red. for 0.015 (tpy)	[redacted]	unquantified		
N'wide PM at 0.01 gr/dscf (tpy)	[redacted]	unquantified		
N'wide em. red. for 0.01 (tpy)	[redacted]	unquantified		
Testing and monitoring costs:				
Total number of fugitive affected facilities to be tested:	22		Model 1 includes:	
No. with wet suppression sprays	10		Primary, secondary, and tertiary crushers (assume 6 water sprays here for inlet/outlet of each crusher)	
No. with carryover or other fugitive control	12		3-4 screening operations (assume 4 water sprays)	
			6-10 transfer points (assume carryover/enclosure here for 10 affl. facilities)	
			storage bin loading operation (assume carryover for bin and enclosure for loading for 2 affl. facilities)	
Total number of stacks to be tested:	0			
N'wide **baseline** testing/monitoring cost:			Test cost x no. new plants x no. affected facilities to be tested	
Total Method 9 initial fugitive testing cost	$ 9,533	C	Includes 1-hour tests only	
Total Method 5 initial stack testing cost:	$ -	C		
Total Method 9 initial stack testing cost:	$ -	C		
Total n'wide baseline testing/mont. cost:				
Capital ($), YRS 1-5	$ 9,533			
Annualized (annual costs + annualized capital), $/yr, YRS 1-5	$ 2,326		CRF at 5 yrs, 7% interest = 0.244	
Capital ($), YR 6+	$ -			
Annualized (annual costs + annualized capital), $/yr, YR 6+	$ -			
N'wide testing/monitoring cost **under revised NSPS**:				
Requirements for fugitive affected facilities				
Total Method 9 initial fugitive testing cost	$ 4,767	C	30-minute tests	
Total Method 9 repeat fugitive test cost (for wet supp. only)	$ -	C 5 yr		
Check that water flowing for wet suppression sprays	$ 1,881	A	Frequency of water checks (times/yr)=	12
Method 9 for carryover or other fugitive control	$ 2,600	C 5 yr	30-minute tests	0
Requirements for stack affected facilities				
Total Method 5 initial stack testing cost	$ -	C	M5 test cost if 1 repeat test conducted in 5 years after promulgation	
Total Method 9 initial stack testing cost	$ -	C	Method 9 stack opacity limit omitted for new	
Total Method 5 repeat stack test cost	$ -	C 5 yr		
Total Method 9 repeat stack test cost	$ -	C 5 yr	Method 9 stack opacity limit omitted for new	
Periodic visual inspections of BH	$ -	A	Frequency of visual inspections (times/yr) =	0
Periodic 30-minute M22 readings for BH's	$ -	A	Frequency of 30-min M22 (times/yr) =	4
Total n'wide revised testing/mont. cost:				
Capital ($), YRS 1-5	$ 4,767			
Annualized (annual costs + annualized capital), $/yr, YRS 1-5	$ 3,044			
Capital ($), YR 6+	$ 2,600			
Annualized (annual costs + annualized capital), $/yr, YR 6+	$ 2,515			
Difference between baseline & revised NSPS				
Capital ($), YRS 1-5	$ (4,767)		Difference due to omitted M9 for stacks. Does not include 5-yr repeat tests.	
Annualized (annual costs + annualized capital), $/yr, YRS 1-5	$ 718			
Capital ($), YR 6+	$ 2,600		includes 5-yr repeat test costs	
Annualized (annual costs + annualized capital), $/yr, YR 6+	$ 2,515		includes 5-yr repeat test costs	

N'wide reporting and recordkeeping (R&R) costs:

N'wide **baseline** R&R cost:

One-time costs:				
Read instructions/rule (1 hr per NMPP)	$	104		
Planning/report for initial performance tests (30 hr per NMPP)	$	3,124	60.8(a) - report	
Planning/report for repeat performance tests (30 hr per NMPP, 20% fail ri	$	625		
Notification of construction/reconstruction (2 hr per NMPP)	$	208	60.7(a)(1)	
Notification of actual startup (2 hr per NMPP)	$	208	60.7(a)(3)	
Notification of initial performance test (2 hr per NMPP)	$	208	60.8(d)	
Notification of physical or operational change (2 hr per NMPP)	$	208	60.7(a)(4)	
Total one-time costs divided by 5 yrs ($/yr) YR 1-5	$	937		
Total one-time costs divided by 5 yrs ($/yr) YR 6+	$	-		
Annual costs:				
Records of startups, shutdowns, malfunctions, etc. (1.5 hr per NMPP)	$	156	60.7(b)	
Record monitoring data (0 hrs/affected facility)	$	-		Wet scrubbers have no parameter recording frequency. Also, models based on BH or wet suppression.
Semiannual wet scrubber monitoring deviation reports	$	-	60.676(d)	Models based on baghouse or wet suppression
Total of one-time costs per year + annual costs ($/yr) YR 1-5	$	1,093		
Total of one-time costs per year + annual costs ($/yr) YR 6+	$	156		

N'wide R&R cost **under revised NSPS**:

One-time costs:				
Read instructions/rule (1 hr per NMPP)	$	104		
Planning/report for initial performance tests (30 hr per NMPP)	$	3,124	60.8(a) - report	
Planning/report for repeat performance tests (30 hr per NMPP, 25% fail n	$	781		Increased fail rate to 25% for revised NSPS since compliance margin is smaller
Planning/report for repeat tests after 6+ yrs	$	3,124		
Planning/report for repeat tests failed after 6+ yrs (5% fail rate)	$	156		Used 5% fail rate because few should fail given the ongoing monitoring.
Notification of construction/reconstruction (2 hr per NMPP)	$	-	60.7(a)(1)	Omitted from NSPS revision
Notification of actual startup (2 hr per NMPP)	$	208	60.7(a)(3)	
Notification of initial performance test (2 hr per NMPP)	$	208	60.8(d)	
Notification of repeat performance test (2 hr per NMPP) after 6+ yrs	$	208	60.8(d)	
Notification of physical or operational change (2 hr per NMPP)	$	208	60.7(a)(4)	
Total one-time costs divided by 5 yrs ($/yr) YR 1-5	$	927		Less than baseline because notification of construction/reconstruction omitted. 5-yr repeat tests not included
Total one-time costs divided by 5 yrs ($/yr) YR 6+	$	686		Includes 5-yr repeat tests
Annual costs:				
Records of startups, shutdowns, malfunctions, etc. (1.5 hr per NMPP)	$	156	60.7(b)	
Planning/report for annual M9 tests for fugitive points with carryover/other	$	-		16 hr/NMPP with fugitive points to be retested x 1.05 to account for 5% fail rate
Record monitoring data:				
Record water flow checks (0.1 hr/water spray/check)	$	1,250		
Record BH visual inspections (0.5 hr/BH/monitoring event)	$	-		
Record BH M22 readings (0.2 hr/BH/monitoring event)	$	-		
Semiannual wet scrubber monitoring deviation reports	$	-	60.676(d)	Models based on baghouse or wet suppression
Total of one-time costs per year + annual costs ($/yr) YR 1-5	$	2,333		
Total of one-time costs per year + annual costs ($/yr) YR 6+	$	2,103		
Difference in R&R costs, $/yr YR 1-5	$	1,239		
Difference in R&R costs, $/yr YR 6+	$	1,947		

Potential emission reduction from increased testing/monitoring on fugitives

N'wide excess PM from malfunctioning fugitive control, lb/hr	1	0.1402 lb/ton x model tph. Used sum of AP-42 uncontrolled PM factors to get 0.1402. 80% control assumed for functional system and 20% assumed for malfnctioning system
Baseline testing/monitoring:		Percent of equipment malfunctioning = 5%
Hours of excess emissions before noticed (1 yr x hr/yr)	2000	Assume takes 1 yr to detect problem, although could continue for longer since no testing/monitoring in current NSPS
Total excess emissions, tpy	0.8	
Revised NSPS testing/monitoring:		
Hours of excess emissions before noticed (frequency x hr/yr)	167	Assumes problem would be caught: monthly
Total excess emissions, tpy	0.1	
Emission reduction from increased testing/monitoring, tpy	0.6	
Cost effectiveness of increased testing/monitoring ($/ton), YRS 1-5	$ 1,241	Difference in annualized cost ($/yr) / Emission reduction (tpy)
Cost effectiveness of increased testing/monitoring ($/ton), YR 6+	$ 4,349	

Parameter		Value	Note	Reference	
Typical Plant size (tph):		25		p. 8-7 of EPA-450/3-83-001a (April 1983 BID)	
Model Plant No.		2		p. 8-6 of EPA-450/3-83-001a (April 1983 BID)	
Gas flow to baghouses (cfm):		11500		p. 8-2 of EPA-450/3-83-001a (April 1983 BID)	
		4700			
Total gas flow		16200			
Model hr/yr		8400			
PM at 0.022 gr/dscf (tpy)		12.8			
Air impacts per model:					
PM at 0.014 gr/dscf (tpy)		8.2			
Em. Red. for 0.014 (tpy)		4.7			
PM at 0.01 gr/dscf (tpy)		5.8			
Em. Red. for 0.01 (tpy)		7.0			
Nationwide air impacts:					
No. of new models projected		1			
N'wide PM at 0.022 gr/dscf (tpy)		13			
N'wide PM at 0.014 gr/dscf (tpy)		8			
N'wide em. red. for 0.014 (tpy)		5			
N'wide PM at 0.01 gr/dscf (tpy)		6			
N'wide em. red. for 0.01 (tpy)		7			
N'wide testing and monitoring costs:					
Total number of fugitive affected facilities to be tested:		0			
No. with wet suppression sprays		0			
No. with carryover or other fugitive control		0			
Total number of stacks to be tested:		9		Based on breakout of affected facility ofm (pp.4-1 to 4-7 of EPA-450/3-82-014)	
N'wide **baseline** testing/monitoring cost:				Test cost x no. new plants x no. affected facilities to be tested	
Total Method 9 initial fugitive testing cost		0	C		
Total Method 5 initial stack testing cost	$	63,000	C		
Total Method 9 initial stack testing cost	$	11,700	C		
Total n'wide baseline testing/mont. cost:					
Capital ($), YRS 1-5	$	74,700			
Annualized (annual costs + annualized capital), $/yr, YRS 1-5	$	18,227		CRF at 5 yrs, 7% interest = 0.244	
Capital ($), YR 6+	$	-			
Annualized (annual costs + annualized capital), $/yr, YR 6+	$	-			
N'wide testing/monitoring cost **under revised NSPS**:					
Requirements for fugitive affected facilities					
Total Method 9 initial fugitive testing cost		0	C		
Total Method 9 repeat fugitive test cost (for wet supp. only)		0	C 5 yr		
Check that water flowing for wet suppression sprays		0	A	Frequency of water checks (times/yr)=	12
Method 9 for carryover or other fugitive control		0	A	Frequency of M9 monitoring (times/yr) =	0
Requirements for stack affected facilities					
Total Method 5 initial stack testing cost	$	63,000	C		
Total Method 9 initial stack testing cost	$	-	C	Method 9 stack opacity limit omitted for new	
Total Method 5 repeat stack test cost	$	-	C 5 yr		
Total Method 9 repeat stack test cost	$	-	C 5 yr	Method 9 stack opacity limit omitted for new	
Periodic visual inspections of BH	$	-	A	Frequency of visual inspections (times/yr) =	0
Periodic 30-minute M22 readings for BH's	$	3,385	A	Frequency of 30-min M22 (times/yr) =	4
Total n'wide revised testing/mont. cost:					
Capital ($), YRS 1-5	$	63,000			
Annualized (annual costs + annualized capital), $/yr, YRS 1-5	$	18,757			
Capital ($), YR 6+	$	-			
Annualized (annual costs + annualized capital), $/yr, YR 6+	$	3,385			
Difference between baseline & revised NSPS					
Capital ($), YRS 1-5	$	(11,700)		Difference due to omitted M9 for stacks. Does not include 5-yr repeat tests.	
Annualized (annual costs + annualized capital), $/yr, YRS 1-5	$	531			
Capital ($), YR 6+	$	-		Includes 5-yr repeat test costs	
Annualized (annual costs + annualized capital), $/yr, YR 6+	$	3,385		Includes 5-yr repeat test costs	

Bent

Potential emission reduction from increased testing/monitoring on BH's

Excess PM from malfunctioning BHs (0.04 - 0.014), gr/dscf		0.026	Data show that 0.04 gr/dscf can be expected from malfunctioning BH (e.g., torn bags)
Excess PM from malfunctioning BH, lb/hr (x no. of plants)		0.2	Based on total model flow to BHs x no. of plants. Percent of equipment malfunctioning = 5%
Baseline testing/monitoring:			
Hours of excess emissions before noticed (1 yr x hr/yr)		8400	Assume takes 1 yr to detect problem, although could continue for longer since no testing/monitoring in current NSPS
Total excess emissions, tpy		0.8	
Revised NSPS testing/monitoring:			
Hours of excess emissions before noticed (frequency x hr/yr)		2100	Assumes problem would be caught: quarterly
Total excess emissions, tpy		0.2	
Emission reduction from increased testing/monitoring, tpy		0.6	
Cost effectiveness of increased testing/monitoring ($/ton), YRS 1-5	$	933	Difference in annualized cost ($/yr) / Emission reduction (tpy)
Cost effectiveness of increased testing/monitoring ($/ton), YR 6+	$	5,954	

N'wide reporting and recordkeeping (R&R) costs:

N'wide **baseline** R&R cost:			
One-time costs:			
Read instructions/rule (1 hr per NMPP)	$	104	
Planning/report for initial **performance tests** (30 hr per NMPP)	$	3,124	60.8(a) - report
Planning/report for **repeat performance tests** (30 hr per NMPP, 20% fail rate)	$	625	
Notification of construction/reconstruction (2 hr per NMPP)	$	208	60.7(a)(1)
Notification of actual startup (2 hr per NMPP)	$	208	60.7(a)(3)
Notification of initial performance test (2 hr per NMPP)	$	208	60.8(d)
Notification of physical or operational change (2 hr per NMPP)	$	208	60.7(a)(4)
Total one-time costs divided by 5 yrs ($/yr) YR 1-5	$	937	
Total one-time costs divided by 5 yrs ($/yr) YR 6+	$	-	
Annual costs:			
Records of startups, shutdowns, malfunctions, etc. (1.5 hr per NMPP)	$	156	60.7(b)
Record monitoring data (0 hr/affected facility)	$	-	Wet scrubbers have no parameter recording frequency. Also, models based on BH or wet suppression.
Semiannual wet scrubber monitoring deviation reports	$	-	60.676(d) Models based on baghouse or wet suppression
Total of one-time costs per year + annual costs ($/yr) YR 1-5	$	1,093	
Total of one-time costs per year + annual costs ($/yr) YR 6+	$	156	

N'wide R&R cost **under revised NSPS**:			
One-time costs			
Read instructions/rule (1 hr per NMPP)	$	104	
Planning/report for initial performance tests (30 hr per NMPP)	$	3,124	60.8(a) - report
Planning/report for **repeat** performance tests (30 hr per NMPP, 25% fail rate)	$	781	Increased fail rate to 25% for revised NSPS since compliance margin is smaller
Planning/report for repeat tests after 6+ yrs	$	-	
Planning/report for repeat tests failed after 6+ yrs (5% fail rate,	$	-	Used 5% fail rate because few should fail given the ongoing monitoring.
Notification of construction/reconstruction (2 hr per NMPP)	$	-	60.7(a)(1) Omitted from NSPS revision
Notification of actual startup (2 hr per NMPP)	$	208	60.7(a)(3)
Notification of initial performance test (2 hr per NMPP)	$	208	60.8(d)
Notification of repeat performance test (2 hr per NMPP) after 6+ yrs	$	-	60.8(d)
Notification of physical or operational change (2 hr per NMPP)	$	208	60.7(a)(4)
Total one-time costs divided by 5 yrs ($/yr) YR 1-5	$	927	Less than baseline because notification of construction/reconstruction omitted. 5-yr repeat tests not included
Total one-time costs divided by 5 yrs ($/yr) YR 6+	$	-	Includes 5-yr repeat tests
Annual costs:			
Records of startups, shutdowns, malfunctions, etc. (1.5 hr per NMPP)	$	156	60.7(b)
Planning/report for annual M9 tests for fugitive points with carryover/other	$	-	16 hr/NMPP with fugitive points to be retested x 1.05 to account for 5% fail rate
Record monitoring data:			
Record water flow checks (0.1 hr/water spray/check)	$	-	
Record BH visual inspections (0.5 hr/BH/monitoring event)	$	-	
Record BH M22 readings (0.2 hr/BH/monitoring event)	$	750	
Semiannual wet scrubber monitoring deviation reports	$	-	60.676(d) Models based on baghouse or wet suppression
Total of one-time costs per year + annual costs ($/yr) YR 1-5	$	1,833	
Total of one-time costs per year + annual costs ($/yr) YR 6+	$	906	
Difference in R&R costs, $/yr YR 1-5	$	739	
Difference in R&R costs, $/yr YR 6+	$	750	

Bent

Parameter	Value	Note	Reference	
Typical Plant size (tph):	25		p. 6-7 of EPA-450/3-83-001a (April 1983 BID)	
Model Plant No.	2		p. 6-8 of EPA-450/3-83-001a (April 1983 BID)	
Gas flow to baghouses (cfm):	11500		p. 6-2 of EPA-450/3-83-001a (April 1983 BID)	
	4700			
Total gas flow	16200			
Model hr/yr	8400			
PM at 0.022 gr/dscf (tpy)	12.8			
Air impacts per model:				
PM at 0.014 gr/dscf (tpy)	8.2			
Em. Red. for 0.014 (tpy)	4.7			
PM at 0.01 gr/dscf (tpy)	5.8			
Em. Red. for 0.01 (tpy)	7.0			
Nationwide air impacts:				
No. of new models projected	4			
N'wide PM at 0.022 gr/dscf (tpy)	51			
N'wide PM at 0.014 gr/dscf (tpy)	33			
N'wide em. red. for 0.014 (tpy)	19			
N'wide PM at 0.01 gr/dscf (tpy)	23			
N'wide em. red. for 0.01 (tpy)	28			
N'wide testing and monitoring costs:				
Total number of fugitive affected facilities to be tested:	0			
No. with wet suppression sprays	0			
No. with carryover or other fugitive control	0			
Total number of stacks to be tested:	9		Based on breakout of affected facility cfm (pp.4-1 to 4-7 of EPA-450/3-82-014)	
N'wide **baseline** testing/monitoring cost:			Test cost x no. new plants x no. affected facilities to be tested	
Total Method 9 initial fugitive testing cost	0	C		
Total Method 5 initial stack testing cost	$ 252,000	C		
Total Method 9 initial stack testing cost	$ 46,800	C		
Total n'wide baseline testing/mont. cost:				
Capital ($), YRS 1-5	$ 298,800			
Annualized (annual costs + annualized capital), $/yr, YRS 1-5	$ 72,907		CRF at 5 yrs, 7% interest = 0.244	
Capital ($), YR 6+	$ -			
Annualized (annual costs + annualized capital), $/yr, YR 6+	$ -			
N'wide testing/monitoring cost **under revised NSPS**:				
Requirements for fugitive affected facilities				
Total Method 9 initial fugitive testing cost	0	C		
Total Method 9 repeat fugitive test cost (for wet supp. only)	0	C 5 yr		
Check that water flowing for wet suppression sprays	0	A	Frequency of water checks (times/yr)=	12
Method 9 for carryover or other fugitive control	0	A	Frequency of M9 monitoring (times/yr) =	0
Requirements for stack affected facilities				
Total Method 5 initial stack testing cost	$ 252,000	C		
Total Method 9 initial stack testing cost	$ -	C	Method 9 stack opacity limit omitted for new	
Total Method 5 repeat stack test cost	$ -	C 5 yr		
Total Method 9 repeat stack test cost	$ -	C 5 yr	Method 9 stack opacity limit omitted for new	
Periodic visual inspections of BH	$ -	A	Frequency of visual inspections (times/yr) =	0
Periodic 30-minute M22 readings for BH's	$ 13,541	A	Frequency of 30-min M22 (times/yr) =	4
Total n'wide revised testing/mont. cost:				
Capital ($), YRS 1-5	$ 252,000			
Annualized (annual costs + annualized capital), $/yr, YRS 1-5	$ 75,029			
Capital ($), YR 6+	$ -			
Annualized (annual costs + annualized capital), $/yr, YR 6+	$ 13,541			
Difference between baseline & revised NSPS:				
Capital ($), YRS 1-5	$ (46,800)		Difference due to omitted M9 for stacks. Does not include 5-yr repeat tests.	
Annualized (annual costs + annualized capital), $/yr, YRS 1-5	$ 2,122			
Capital ($), YR 6+	$ -		Includes 5-yr repeat test costs	
Annualized (annual costs + annualized capital), $/yr, YR 6+	$ 13,541		Includes 5-yr repeat test costs	

FEarth

Potential emission reduction from increased testing/monitoring on BH's				Unable to quantify benefits for wet suppression. Data show that 0.04 gr/dscf can be expected from malfunctioning BH (e.g., torn bags)
Excess PM from malfunctioning BHs (0.04 - 0.014), gr/dscf		0.026		
Excess PM from malfunctioning BH, lb/hr (x no. of plants)		0.7		Based on total model flow to BHs x no. of plants. Percent of equipment malfunctioning = 6%
Baseline testing/monitoring:				
Hours of excess emissions before noticed (1 yr x hr/yr)		8400		Assume takes 1 yr to detect problem, although could continue for longer since no testing/monitoring in current NSPS
Total excess emissions, tpy		3.0		
Revised NSPS testing/monitoring:				
Hours of excess emissions before noticed (frequency x hr/yr)		2100		Assumes problem would be caught: quarterly
Total excess emissions, tpy		0.8		
Emission reduction from increased testing/monitoring, tpy		2.3		
Cost effectiveness of increased testing/monitoring ($/ton), YRS 1-5	$	933		Difference in annualized cost ($/yr) / Emission reduction (tpy)
Cost effectiveness of increased testing/monitoring ($/ton), YR 6+	$	5,954		
N'wide reporting and recordkeeping (R&R) costs:				
N'wide **baseline** R&R cost:				
One-time costs:				
Read instructions/rule (1 hr per NMPP)	$	417		
Planning/report for initial performance tests (30 hr per NMPP)	$	12,496	60.8(a) - report	
Planning/report for repeat performance tests (30 hr per NMPP, 20% fail	$	2,499		
Notification of construction/reconstruction (2 hr per NMPP)	$	833	60.7(a)(1)	
Notification of actual startup (2 hr per NMPP)	$	833	60.7(a)(3)	
Notification of initial performance test (2 hr per NMPP)	$	833	60.8(d)	
Notification of physical or operational change (2 hr per NMPP)	$	833	60.7(a)(4)	
Total one-time costs divided by 5 yrs ($/yr) YR 1-5	$	3,749		
Total one-time costs divided by 5 yrs ($/yr) YR 6+	$	-		
Annual costs:				
Records of startups, shutdowns, malfunctions, etc. (1.5 hr per NMPP)	$	625	60.7(b)	
Record monitoring data (0 hr/affected facility)	$	-		Wet scrubbers have no parameter recording frequency. Also, models based on BH or wet suppression.
Semiannual wet scrubber monitoring deviation reports	$	-	60.676(c)	Models based on baghouse or wet suppression
Total of one-time costs per year + annual costs ($/yr) YR 1-5	$	4,374		
Total of one-time costs per year + annual costs ($/yr) YR 6+	$	625		
N'wide R&R cost **under revised NSPS:**				
One-time costs				
Read instructions/rule (1 hr per NMPP)	$	417		
Planning/report for initial performance tests (30 hr per NMPP)	$	12,496	60.8(a) - report	
Planning/report for repeat performance tests (30 hr per NMPP, 25% fail	$	3,124		Increased fail rate to 25% for revised NSPS since compliance margin is smaller
Planning/report for repeat tests after 6+ yrs	$	-		
Planning/report for repeat tests failed after 6+ yrs (5% fail rate)	$	-		Used 5% fail rate because few should fail given the ongoing monitoring.
Notification of construction/reconstruction (2 hr per NMPP)	$	-	60.7(a)(1)	Omitted from NSPS revision
Notification of actual startup (2 hr per NMPP)	$	833	60.7(a)(3)	
Notification of initial performance test (2 hr per NMPP)	$	833	60.8(d)	
Notification of repeat performance test (2 hr per NMPP) after 6+ yrs	$	-	60.8(d)	
Notification of physical or operational change (2 hr per NMPP)	$	833	60.7(a)(4)	
Total one-time costs divided by 5 yrs ($/yr) YR 1-5	$	3,707		Less than baseline because notification of construction/reconstruction omitted. 5-yr repeat tests not included
Total one-time costs divided by 5 yrs ($/yr) YR 6+	$	-		Includes 5-yr repeat tests
Annual costs:				
Records of startups, shutdowns, malfunctions, etc. (1.5 hr per NMPP)	$	625	60.7(b)	
Planning/report for annual M9 tests for fugitive points with carryover/othe	$	-		16 hr/NMPP with fugitive points to be retested x 1.05 to account for 5% fail rate
Record monitoring data:				
Record water flow checks (0.1 hr/water spray/check)	$	-		
Record BH visual inspections (0.5 hr/BH/monitoring event)	$	-		
Record BH M22 readings (0.2 hr/BH/monitoring event)	$	2,999		
Semiannual wet scrubber monitoring deviation reports	$	-	60.676(d)	Models based on baghouse or wet suppression
Total of one-time costs per year + annual costs ($/yr) YR 1-5	$	7,331		
Total of one-time costs per year + annual costs ($/yr) YR 6+	$	3,624		
Difference in R&R costs, $/yr YR 1-5	$	2,957		
Difference in R&R costs, $/yr YR 6+	$	2,999		

FEarth

Parameter		Value	Note	Reference	
Typical Plant size (tph):		25		p. 5-7 of EPA-450/3-83-001a (April 1983 BID)	
Model Plant No.		2		p. 5-6 of EPA-450/3-83-001a (April 1983 BID)	
Gas flow to baghouses (cfm):		11500		p. 5-2 of EPA-450/3-83-001a (April 1983 BID)	
		4700			
Total gas flow		16200			
Model hr/yr		8400			
PM at 0.022 gr/dscf (tpy)		12.8			
Air impacts per model:					
PM at 0.014 gr/dscf (tpy)		8.2			
Em. Red. for 0.014 (tpy)		4.7			
PM at 0.01 gr/dscf (tpy)		5.8			
Em. Red. for 0.01 (tpy)		7.0			
Nationwide air impacts:					
No. of new models projected		1			
N'wide PM at 0.022 gr/dscf (tpy)		13			
N'wide PM at 0.014 gr/dscf (tpy)		8			
N'wide em. red. for 0.014 (tpy)		5			
N'wide PM at 0.01 gr/dscf (tpy)		6			
N'wide em. red. for 0.01 (tpy)		7			
N'wide testing and monitoring costs:					
Total number of fugitive affected facilities to be tested:		0			
No. with wet suppression sprays		0			
No. with carryover or other fugitive control		0			
Total number of stacks to be tested:		9		Based on breakout of affected facility cfm (pp 4-1 to 4-7 of EPA-450/3-82-014)	
N'wide **baseline** testing/monitoring cost:				Test cost x no. new plants x no. affected facilities to be tested	
Total Method 9 initial fugitive testing cost		0	C		
Total Method 5 initial stack testing cost	$	63,000	C		
Total Method 9 initial stack testing cost	$	11,700	C		
Total n'wide baseline testing/mont. cost:					
Capital ($), YRS 1-5	$	74,700			
Annualized (annual costs + annualized capital), $/yr, YRS 1-5	$	18,227		CRF at 5 yrs, 7% interest = 0.244	
Capital ($), YR 6+	$	-			
Annualized (annual costs + annualized capital), $/yr, YR 6+	$	-			
N'wide testing/monitoring cost **under revised NSPS**:					
Requirements for fugitive affected facilities					
Total Method 9 initial fugitive testing cost		0	C		
Total Method 9 repeat fugitive test cost (for wet supp. only)		0	C 5 yr		
Check that water flowing for wet suppression sprays		0	A	Frequency of water checks (times/yr)=	12
Method 9 for carryover or other fugitive control		0	A	Frequency of M9 monitoring (times/yr) =	0
Requirements for stack affected facilities					
Total Method 5 initial stack testing cost	$	63,000	C		
Total Method 9 initial stack testing cost	$	-	C	Method 9 stack opacity limit omitted for new	
Total Method 5 repeat stack test cost	$	-	C 5 yr		
Total Method 9 repeat stack test cost	$	-	C 5 yr	Method 9 stack opacity limit omitted for new	
Periodic visual inspections of BH	$	-	A	Frequency of visual inspections (times/yr) =	0
Periodic 30-minute M22 readings for BH's	$	3,385	A	Frequency of 30-min M22 (times/yr) =	4
Total n'wide revised testing/mont. cost:					
Capital ($), YRS 1-5	$	63,000			
Annualized (annual costs + annualized capital), $/yr, YRS 1-5	$	18,757			
Capital ($), YR 6+	$	-			
Annualized (annual costs + annualized capital), $/yr, YR 6+	$	3,385			
Difference between baseline & revised NSPS					
Capital ($), YRS 1-5	$	(11,700)		Difference due to omitted M9 for stacks. Does not include 5-yr repeat tests.	
Annualized (annual costs + annualized capital), $/yr, YRS 1-5	$	531			
Capital ($), YR 6+	$	-		Includes 5-yr repeat test costs	
Annualized (annual costs + annualized capital), $/yr, YR 6+	$	3,385		Includes 5-yr repeat test costs	

Ball clay

Potential emission reduction from increased testing/monitoring on BH's				Unable to quantify benefits for wet suppression.
Excess PM from malfunctioning BHs (0.04 - 0.014), gr/dscf		0.026		Data show that 0.04 gr/dscf can be expected from malfunctioning BH (e.g., torn bags)
Excess PM from malfunctioning BH, lb/hr (x no. of plants)		0.2		Based on total model flow to BHs x no. of plants. Percent of equipment malfunctioning = 5%
Baseline testing/monitoring:				
Hours of excess emissions before noticed (1 yr x hr/yr)		8400		Assume takes 1 yr to detect problem, although could continue for longer since no testing/monitoring in current NSPS
Total excess emissions, tpy		0.8		
Revised NSPS testing/monitoring:				
Hours of excess emissions before noticed (frequency x hr/yr)		2100		Assumes problem would be caught: quarterly
Total excess emissions, tpy		0.2		
Emission reduction from increased testing/monitoring, tpy		0.6		
Cost effectiveness of increased testing/monitoring ($/ton), YRS 1-5	$	933		Difference in annualized cost ($/yr) / Emission reduction (tpy)
Cost effectiveness of increased testing/monitoring ($/ton), YR 6+	$	5,954		
N'wide reporting and recordkeeping (R&R) costs:				
N'wide **baseline** R&R cost:				
One-time costs:				
Read instructions/rule (1 hr per NMPP)	$	104		
Planning/report for initial performance tests (30 hr per NMPP)	$	3,124	60.8(a) - report	
Planning/report for repeat performance tests (30 hr per NMPP, 20% fail	$	625		
Notification of construction/reconstruction (2 hr per NMPP)	$	208	60.7(a)(1)	
Notification of actual startup (2 hr per NMPP)	$	208	60.7(a)(3)	
Notification of initial performance test (2 hr per NMPP)	$	208	60.8(d)	
Notification of physical or operational change (2 hr per NMPP)	$	208	60.7(a)(4)	
Total one-time costs divided by 5 yrs ($/yr) YR 1-5	$	937		
Total one-time costs divided by 5 yrs ($/yr) YR 6+	$	-		
Annual costs:				
Records of startups, shutdowns, malfunctions, etc. (1.5 hr per NMPP)	$	156	60.7(b)	
Record monitoring data (0 hr/affected facility)	$	-		Wet scrubbers have no parameter recording frequency. Also, models based on BH or wet suppression.
Semiannual wet scrubber monitoring deviation reports	$	-	60.676(d)	Models based on baghouse or wet suppression
Total of one-time costs per year + annual costs ($/yr) YR 1-5	$	1,093		
Total of one-time costs per year + annual costs ($/yr) YR 6+	$	156		
N'wide R&R cost **under revised NSPS**				
One-time costs				
Read instructions/rule (1 hr per NMPP)	$	104		
Planning/report for initial performance tests (30 hr per NMPP)	$	3,124	60.8(a) - report	
Planning/report for repeat performance tests (30 hr per NMPP, 25% fail	$	781		Increased fail rate to 25% for revised NSPS since compliance margin is smaller
Planning/report for repeat tests after 6+ yrs	$	-		
Planning/report for repeat tests failed after 6+ yrs (5% fail rate,	$	-		Used 5% fail rate because few should fail given the ongoing monitoring.
Notification of construction/reconstruction (2 hr per NMPP)	$	-	60.7(a)(1)	Omitted from NSPS revision
Notification of actual startup (2 hr per NMPP)	$	208	60.7(a)(3)	
Notification of initial performance test (2 hr per NMPP)	$	208	60.8(d)	
Notification of repeat performance test (2 hr per NMPP) after 6+ yrs	$	-	60.8(d)	
Notification of physical or operational change (2 hr per NMPP)	$	208	60.7(a)(4)	
Total one-time costs divided by 5 yrs ($/yr) YR 1-5	$	927		Less than baseline because notification of construction/reconstruction omitted. 5-yr repeat tests not included
Total one-time costs divided by 5 yrs ($/yr) YR 6+	$	-		Includes 5-yr repeat tests
Annual costs:				
Records of startups, shutdowns, malfunctions, etc. (1.5 hr per NMPP)	$	156	60.7(b)	
Planning/report for annual M9 tests for fugitive points with carryover/oth	$	-		16 hr/NMPP with fugitive points to be retested x 1.05 to account for 5% fail rate
Record monitoring data:				
Record water flow checks (0.1 hr/water spray/check)	$	-		
Record BH visual inspections (0.5 hr/BH/monitoring event)	$	-		
Record BH M22 readings (0.2 hr/BH/monitoring event)	$	750		
Semiannual wet scrubber monitoring deviation reports	$	-	60.676(d)	Models based on baghouse or wet suppression
Total of one-time costs per year + annual costs ($/yr) YR 1-5	$	1,833		
Total of one-time costs per year + annual costs ($/yr) YR 6+	$	906		
Diffrerence in R&R costs, $/yr YR 1-5	$	739		
Diffrerence in R&R costs, $/yr YR 6+	$	750		

Ball clay

Parameter		Value	Note	Reference	
Typical Plant size (tph)		25		p. 6-7 of EPA-450/3-83-001a (April 1983 BID)	
Model Plant No.		2		p. 6-6 of EPA-450/3-83-001a (April 1983 BID)	
Gas flow to baghouses (cfm):		11500		p. 6-2 of EPA-450/3-83-001a (April 1983 BID)	
		4700			
Total gas flow		16200			
Model hr/yr		8400			
PM at 0.022 gr/dscf (tpy)		12.8			
Air impacts per model:					
PM at 0.014 gr/dscf (tpy)		8.2			
Em. Red. for 0.014 (tpy)		4.7			
PM at 0.01 gridscf (tpy)		5.8			
Em. Red. for 0.01 (tpy)		7.0			
Nationwide air impacts:					
No. of new models projected		7			
N'wide PM at 0.022 gr/dscf (tpy)		90			
N'wide PM at 0.014 gr/dscf (tpy)		57			
N'wide em. red. for 0.014 (tpy)		33			
N'wide PM at 0.01 gridscf (tpy)		41			
N'wide em. red. for 0.01 (tpy)		49			
N'wide testing and monitoring costs:					
Total number of fugitive affected facilities to be tested:		0			
No. with wet suppression sprays		0			
No. with carryover or other fugitive control		0			
Total number of stacks to be tested:		9		Based on breakout of affected facility ctm (pp.4-1 to 4-7 of EPA-450/3-82-014)	
N'wide **baseline** testing/monitoring cost:				Test cost x no. new plants x no. affected facilities to be tested	
Total Method 9 initial fugitive testing cost		0	C		
Total Method 5 initial stack testing cost	$	441,000	C		
Total Method 9 initial stack testing cost	$	81,900	C		
Total n'wide baseline testing/mont. cost:					
Capital ($), YRS 1-5	$	522,900			
Annualized (annual costs + annualized capital), $/yr, YRS 1-5	$	127,588		CRF at 5 yrs, 7% interest = 0.244	
Capital ($), YR 6+	$	-			
Annualized (annual costs + annualized capital), $/yr, YR 6+	$	-			
N'wide testing/monitoring cost **under revised NSPS**:					
Requirements for fugitive affected facilities					
Total Method 9 initial fugitive testing cost		0	C		
Total Method 9 repeat fugitive test cost (for wet supp. only)		0	C 5 yr		
Check that water flowing for wet suppression sprays		0	A	Frequency of water checks (times/yr)=	12
Method 9 for carryover or other fugitive control		0	A	Frequency of M9 monitoring (times/yr) =	0
Requirements for stack affected facilities					
Total Method 5 initial stack testing cost	$	441,000	C		
Total Method 9 initial stack testing cost	$	-	C	Method 9 stack opacity limit omitted for new	
Total Method 5 repeat stack test cost	$	-	C 5 yr		
Total Method 9 repeat stack test cost	$	-	C 5 yr	Method 9 stack opacity limit omitted for new	
Periodic visual inspections of BH	$	-	A	Frequency of visual inspections (times/yr) =	0
Periodic 30-minute M22 readings for BH's	$	23,696	A	Frequency of 30-min M22 (times/yr) =	4
Total n'wide revised testing/mont. cost:					
Capital ($), YRS 1-5	$	441,000			
Annualized (annual costs + annualized capital), $/yr, YRS 1-5	$	131,302			
Capital ($), YR 6+	$	-			
Annualized (annual costs + annualized capital), $/yr, YR 6+	$	23,696			
Difference between baseline & revised NSPS					
Capital ($), YRS 1-5	$	(81,900)		Difference due to omitted M9 for stacks. Does not include 5-yr repeat tests	
Annualized (annual costs + annualized capital), $/yr, YRS 1-5	$	3,714			
Capital ($), YR 6+	$	-		includes 5-yr repeat test costs	
Annualized (annual costs + annualized capital), $/yr, YR 6+	$	23,696		includes 5-yr repeat test costs	

Potential emission reduction from increased testing/monitoring on BH's				Unable to quantify benefits for wet suppression.
Excess PM from malfunctioning BHs (0.04 - 0.014), gr/dscf		0.026		Data show that 0.04 gr/dscf can be expected from malfunctioning BH (e.g., torn bags)
Excess PM from malfunctioning BH, lb/hr (x no. of plants)		1.3		Based on total model flow to BHs x no. of plants. Percent of equipment malfunctioning = 5%
Baseline testing/monitoring:				
Hours of excess emissions before noticed (1 yr x hr/yr)		8400		Assume takes 1 yr to detect problem, although could continue for longer since no testing/monitoring in current NSPS
Total excess emissions, tpy		5.3		
Revised NSPS testing/monitoring:				
Hours of excess emissions before noticed (frequency x hr/yr)		2100		Assumes problem would be caught: quarterly
Total excess emissions, tpy		1.3		
Emission reduction from increased testing/monitoring, tpy		4.0		
Cost effectiveness of increased testing/monitoring ($/ton), YRS 1-5	$	933		Difference in annualized cost ($/yr) / Emission reduction (tpy)
Cost effectiveness of increased testing/monitoring ($/ton), YR 6+	$	5,954		
N'wide reporting and recordkeeping (R&R) costs:				
N'wide **baseline** R&R cost:				
One-time costs:				
Read instructions/rule (1 hr per NMPP)	$	729		
Planning/report for initial performance tests (30 hr per NMPP)	$	21,868	60.8(a) - report	
Planning/report for repeat performance tests (30 hr per NMPP, 20% fail	$	4,374		
Notification of construction/reconstruction (2 hr per NMPP)	$	1,458	60.7(a)(1)	
Notification of actual startup (2 hr per NMPP)	$	1,458	60.7(a)(3)	
Notification of initial performance test (2 hr per NMPP)	$	1,458	60.8(d)	
Notification of physical or operational change (2 hr per NMPP)	$	1,458	60.7(a)(4)	
Total one-time costs divided by 5 yrs ($/yr) YR 1-5	$	6,560		
Total one-time costs divided by 5 yrs ($/yr) YR 6+	$	-		
Annual costs:				
Records of startups, shutdowns, malfunctions, etc. (1.5 hr per NMPP)	$	1,093	60.7(b)	
Record monitoring data (0 hr/affected facility)	$	-		Wet scrubbers have no parameter recording frequency. Also, models based on BH or wet suppression.
Semiannual wet scrubber monitoring deviation reports	$	-	60.676(d)	Models based on baghouse or wet suppression
Total of one-time costs per year + annual costs ($/yr) YR 1-5	$	7,654		
Total of one-time costs per year + annual costs ($/yr) YR 6+	$	1,093		
N'wide R&R cost **under revised NSPS**:				
One-time costs				
Read instructions/rule (1 hr per NMPP)	$	729		
Planning/report for initial performance tests (30 hr per NMPP)	$	21,868	60.8(a) - report	
Planning/report for repeat performance tests (30 hr per NMPP, 25% fail	$	5,467		Increased fail rate to 25% for revised NSPS since compliance margin is smaller
Planning/report for repeat tests after 6+ yrs	$	-		
Planning/report for repeat tests failed after 6+ yrs (5% fail rate,	$	-		Used 5% fail rate because few should fail given the ongoing monitoring.
Notification of construction/reconstruction (2 hr per NMPP)	$	-	60.7(a)(1)	Omitted from NSPS revision
Notification of actual startup (2 hr per NMPP)	$	1,458	60.7(a)(3)	
Notification of initial performance test (2 hr per NMPP)	$	1,458	60.8(d)	
Notification of repeat performance test (2 hr per NMPP) after 6+ yrs	$	-	60.8(d)	
Notification of physical or operational change (2 hr per NMPP)	$	1,458	60.7(a)(4)	
				Less than baseline because notification of construction/reconstruction omitted. 5-yr repeat tests not included
Total one-time costs divided by 5 yrs ($/yr) YR 1-5	$	6,487		Includes 5-yr repeat tests
Total one-time costs divided by 5 yrs ($/yr) YR 6+	$	-		
Annual costs:				
Records of startups, shutdowns, malfunctions, etc. (1.5 hr per NMPP)	$	1,093	60.7(b)	
Planning/report for annual M9 tests for fugitive points with carryover/othe	$	-		16 hr/NMPP with fugitive points to be retested x 1.05 to account for 5% fail rate
Record monitoring data:				
Record water flow checks (0.1 hr/water spray/check)	$	-		
Record BH visual inspections (0.5 hr/BH/monitoring event)	$	-		
Record BH M22 readings (0.2 hr/BH/monitoring event)	$	5,248		
Semiannual wet scrubber monitoring deviation reports	$	-	60.676(d)	Models based on baghouse or wet suppression
Total of one-time costs per year + annual costs ($/yr) YR 1-5	$	12,829		
Total of one-time costs per year + annual costs ($/yr) YR 6+	$	6,342		
Diffrerence in R&R costs, $/yr YR 1-5	$	5,175		
Diffrerence in R&R costs, $/yr YR 6+	$	5,248		

Gypsum

Parameter	Value	Note	Reference	
Typical Plant size (tph)	25		p. 6-7 of EPA-450/3-83-001a (April 1983 BID)	
Model Plant No.	2		p. 6-6 of EPA-450/3-83-001a (April 1983 BID)	
Gas flow to baghouses (cfm):	11500		p. 6-2 of EPA-450/3-83-001a (April 1983 BID)	
	4700			
Total gas flow	16200			
Model hr/yr	8400			
PM at 0.022 gr/dscf (tpy)	12.8			
Air Impacts per model:				
PM at 0.014 gr/dscf (tpy)	8.2			
Em. Red. for 0.014 (tpy)	4.7			
PM at 0.01 gr/dscf (tpy)	5.8			
Em. Red. for 0.01 (tpy)	7.0			
Nationwide air impacts:				
No. of new models projected	1			
N'wide PM at 0.022 gr/dscf (tpy)	13			
N'wide PM at 0.014 gr/dscf (tpy)	8			
N'wide em. red. for 0.014 (tpy)	5			
N'wide PM at 0.01 gr/dscf (tpy)	6			
N'wide em. red. for 0.01 (tpy)	7			
N'wide testing and monitoring costs:				
Total number of fugitive affected facilities to be tested:	0			
No. with wet suppression sprays	0			
No. with carryover or other fugitive control	0			
Total number of stacks to be tested:	9		Based on breakout of affected facility cfm (pp.4-1 to 4-7 of EPA-450/3-82-014)	
N'wide **baseline** testing/monitoring cost			Test cost x no. new plants x no. affected facilities to be tested	
Total Method 9 initial fugitive testing cost	0	C		
Total Method 5 initial stack testing cost	$ 63,000	C		
Total Method 9 initial stack testing cost	$ 11,700	C		
Total n'wide baseline testing/mont. cost:				
Capital ($), YRS 1-5	$ 74,700			
Annualized (annual costs + annualized capital), $/yr, YRS 1-5	$ 18,227		CRF at 5 yrs, 7% interest = 0.244	
Capital ($), YR 6+	$ -			
Annualized (annual costs + annualized capital), $/yr, YR 6+	$ -			
N'wide testing/monitoring cost **under revised NSPS**:				
Requirements for fugitive affected facilities				
Total Method 9 initial fugitive testing cost	0	C		
Total Method 9 repeat fugitive test cost (for wet supp. only)	0	C 5 yr		
Check that water flowing for wet suppression sprays	0	A	Frequency of water checks (times/yr)=	12
Method 9 for carryover or other fugitive control	0	A	Frequency of M9 monitoring (times/yr) =	0
Requirements for stack affected facilities				
Total Method 5 initial stack testing cost	$ 63,000	C		
Total Method 9 initial stack testing cost	$ -	C	Method 9 stack opacity limit omitted for new	
Total Method 5 repeat stack test cost	$ -	C 5 yr		
Total Method 9 repeat stack test cost	$ -	C 5 yr	Method 9 stack opacity limit omitted for new	
Periodic visual inspections of BH	$ -	A	Frequency of visual inspections (times/yr) =	0
Periodic 30-minute M22 readings for BH's	$ 3,385	A	Frequency of 30-min M22 (times/yr) =	4
Total n'wide revised testing/mont. cost:				
Capital ($), YRS 1-5	$ 63,000			
Annualized (annual costs + annualized capital), $/yr, YRS 1-5	$ 18,757			
Capital ($), YR 6+	$ -			
Annualized (annual costs + annualized capital), $/yr, YR 6+	$ 3,385			
Difference between baseline & revised NSPS				
Capital ($), YRS 1-5	$ (11,700)		Difference due to omitted M9 for stacks. Does not include 5-yr repeat tests.	
Annualized (annual costs + annualized capital), $/yr, YRS 1-5	$ 531			
Capital ($), YR 6+	$ -		Includes 5-yr repeat test costs	
Annualized (annual costs + annualized capital), $/yr, YR 6+	$ 3,385		Includes 5-yr repeat test costs	

Salt

Potential emission reduction from increased testing/monitoring on BH's				Unable to quantify benefits for wet suppression.
Excess PM from malfunctioning BHs (0.04 - 0.014), grids/cf		0.026		Data show that 0.04 grids/cf can be expected from malfunctioning BH (e.g., torn bags)
Excess PM from malfunctioning BH, lb/hr (x no. of plants)		0.2		Based on total model flow to BHs x no. of plants. Percent of equipment malfunctioning = 5%
Baseline testing/monitoring:				
Hours of excess emissions before noticed (1 yr x hr/yr)		8400		Assume takes 1 yr to detect problem, although could continue for longer since no testing/monitoring in current NSPS
Total excess emissions, tpy		0.8		
Revised NSPS testing/monitoring:				
Hours of excess emissions before noticed (frequency x hr/yr)		2100		Assumes problem would be caught: quarterly
Total excess emissions, tpy		0.2		
Emission reduction from increased testing/monitoring, tpy		0.6		
Cost effectiveness of increased testing/monitoring ($/ton), YRS 1-5	$	933		Difference in annualized cost ($/yr) / Emission reduction (tpy)
Cost effectiveness of increased testing/monitoring ($/ton), YR 6+	$	5,954		
N'wide reporting and recordkeeping (R&R) costs:				
N'wide **baseline** R&R cost:				
One-time costs:				
Read instructions/rule (1 hr per NMPP)	$	104		
Planning/report for initial performance tests (30 hr per NMPP)	$	3,124	60.8(a) - report	
Planning/report for repeat performance tests (30 hr per NMPP, 20% fail	$	625		
Notification of construction/reconstruction (2 hr per NMPP)	$	208	60.7(a)(1)	
Notification of actual startup (2 hr per NMPP)	$	208	60.7(a)(3)	
Notification of initial performance test (2 hr per NMPP)	$	208	60.8(d)	
Notification of physical or operational change (2 hr per NMPP)	$	208	60.7(a)(4)	
Total one-time costs divided by 5 yrs ($/yr) YR 1-5	$	937		
Total one-time costs divided by 5 yrs ($/yr) YR 6+	$	-		
Annual costs:				
Records of startups, shutdowns, malfunctions, etc. (1.5 hr per NMPP)	$	156	60.7(b)	
Record monitoring data (0 hr/affected facility)	$	-		Wet scrubbers have no parameter recording frequency. Also, models based on BH or wet suppression.
Semiannual wet scrubber monitoring deviation reports	$	-	60.676(d)	Models based on baghouse or wet suppression
Total of one-time costs per year + annual costs ($/yr) YR 1-5	$	1,093		
Total of one-time costs per year + annual costs ($/yr) YR 6+	$	156		
N'wide R&R cost **under revised NSPS**:				
One-time costs				
Read instructions/rule (1 hr per NMPP)	$	104		
Planning/report for initial performance tests (30 hr per NMPP)	$	3,124	60.8(a) - report	
Planning/report for repeat performance tests (30 hr per NMPP, 25% fail	$	781		Increased fail rate to 25% for revised NSPS since compliance margin is smaller
Planning/report for repeat tests after 6+ yrs	$	-		
Planning/report for repeat tests failed after 6+ yrs (5% fail rate,	$	-		Used 5% fail rate because few should fail given the ongoing monitoring.
Notification of construction/reconstruction (2 hr per NMPP)	$	-	60.7(a)(1)	Omitted from NSPS revision
Notification of actual startup (2 hr per NMPP)	$	208	60.7(a)(3)	
Notification of initial performance test (2 hr per NMPP)	$	208	60.8(d)	
Notification of repeat performance test (2 hr per NMPP) after 6+ yrs	$	-	60.8(d)	
Notification of physical or operational change (2 hr per NMPP)	$	208	60.7(a)(4)	
Total one-time costs divided by 5 yrs ($/yr) YR 1-5	$	927		Less than baseline because notification of construction/reconstruction omitted. 5-yr repeat tests not included
Total one-time costs divided by 5 yrs ($/yr) YR 6+	$	-		Includes 5-yr repeat tests
Annual costs:				
Records of startups, shutdowns, malfunctions, etc. (1.5 hr per NMPP)	$	156	60.7(b)	
Planning/report for annual M9 tests for fugitive points with carryover/othe	$	-		16 hr/NMPP with fugitive points to be retested x 1.05 to account for 5% fail rate
Record monitoring data:				
Record water flow checks (0.1 hr/water spray/check)	$	-		
Record BH visual inspections (0.5 hr/BH/monitoring event)	$	-		
Record BH M22 readings (0.2 hr/BH/monitoring event)	$	750		
Semiannual wet scrubber monitoring deviation reports	$	-	60.676(d)	Models based on baghouse or wet suppression
Total of one-time costs per year + annual costs ($/yr) YR 1-5	$	1,833		
Total of one-time costs per year + annual costs ($/yr) YR 6+	$	906		
Diffference in R&R costs, $/yr YR 1-5	$	739		
Diffference in R&R costs, $/yr YR 6+	$	750		

Salt

Parameter	Value	Note	Reference	
Typical Plant size (tph):	300		p. 6-7 of EPA-450/3-83-001a (April 1983 BID)	
Model Plant No.	2		p. 6-6 of EPA-450/3-83-001a (April 1983 BID)	
Gas flow to baghouses (cfm):	40000		p. 6-2 of EPA-450/3-83-001a (April 1983 BID)	
	8000			
	22600			
Total gas flow	70600			
Model hr/yr	8400			
PM at 0.022 gr/dscf (tpy)	55.9			
Air impacts per model:				
PM at 0.014 gr/dscf (tpy)	35.6			
Em. Red. for 0.014 (tpy)	20.3			
PM at 0.01 gr/dscf (tpy)	25.4			
Em. Red. for 0.01 (tpy)	30.5			
Nationwide air impacts:				
No. of new models projected	1			
N'wide PM at 0.022 gr/dscf (tpy)	56			
N'wide PM at 0.014 gr/dscf (tpy)	36			
N'wide em. red. for 0.014 (tpy)	20			
N'wide PM at 0.01 gr/dscf (tpy)	25			
N'wide em. red. for 0.01 (tpy)	30			
N'wide testing and monitoring costs:				
Total number of fugitive affected facilities to be tested:	0			
No. with wet suppression sprays	0			
No. with carryover or other fugitive control	0			
Total number of stacks to be tested:	12		Based on breakout of affected facility cfm (pp.4-1 to 4-7 of EPA-450/3-82-014)	
N'wide **baseline** testing/monitoring cost:			Test cost x no. new plants x no. affected facilities to be tested	
Total Method 9 initial fugitive testing cost	0	C		
Total Method 5 initial stack testing cost	$ 84,000	C		
Total Method 9 initial stack testing cost	$ 16,600	C		
Total n'wide baseline testing/mont. cost:				
Capital ($), YRS 1-5	$ 99,600			
Annualized (annual costs + annualized capital), $/yr, YRS 1-5	$ 24,302		CRF at 5 yrs, 7% interest = 0.244	
Capital ($), YR 6+	$ -			
Annualized (annual costs + annualized capital), $/yr, YR 6+	$ -			
N'wide testing/monitoring cost **under revised NSPS**:				
Requirements for fugitive affected facilities:				
Total Method 9 initial fugitive testing cost	0	C		
Total Method 9 repeat fugitive test cost (for wet supp. only)	0	C 5 yr		
Check that water flowing for wet suppression sprays	0	A	Frequency of water checks (times/yr)=	12
Method 9 for carryover or other fugitive control	0	A	Frequency of M9 monitoring (times/yr) =	0
Requirements for stack affected facilities:				
Total Method 5 initial stack testing cost	$ 84,000	C		
Total Method 9 initial stack testing cost	$ -	C	Method 9 stack opacity limit omitted for new	
Total Method 5 repeat stack test cost	$ -	C 5 yr		
Total Method 9 repeat stack test cost	$ -	C 5 yr	Method 9 stack opacity limit omitted for new	
Periodic visual inspections of BH	$ -	A	Frequency of visual inspections (times/yr) =	0
Periodic 30-minute M22 readings for BH's	$ 4,514	A	Frequency of 30-min M22 (times/yr) =	4
Total n'wide revised testing/mont. cost:				
Capital ($), YRS 1-5	$ 84,000			
Annualized (annual costs + annualized capital), $/yr, YRS 1-5	$ 25,010			
Capital ($), YR 6+	$ -			
Annualized (annual costs + annualized capital), $/yr, YR 6+	$ 4,514			
Difference between baseline & revised NSPS:				
Capital ($), YRS 1-5	$ (15,600)		Difference due to omitted M9 for stacks. Does not include 5-yr repeat tests.	
Annualized (annual costs + annualized capital), $/yr, YRS 1-5	$ 707			
Capital ($), YR 6+	$ -		includes 5-yr repeat test costs	
Annualized (annual costs + annualized capital), $/yr, YR 6+	$ 4,514		includes 5-yr repeat test costs	

Soda ash

Potential emission reduction from increased testing/monitoring on BH's				Unable to quantify benefits for wet suppression.
Excess PM from malfunctioning BHs (0.04 - 0.014), gr/dscf		0.026		Data show that 0.04 gr/dscf can be expected from malfunctioning BH (e.g., torn bags)
Excess PM from malfunctioning BH, lb/hr (x no. of plants)		0.8		Based on total model flow to BHs x no. of plants. Percent of equipment malfunctioning = 5%
Baseline testing/monitoring:				
Hours of excess emissions before noticed (1 yr x hr/yr)		8400		Assume takes 1 yr to detect problem, although could continue for longer since no testing/monitoring in current NSPS
Total excess emissions, tpy		3.3		
Revised NSPS testing/monitoring:				
Hours of excess emissions before noticed (frequency x hr/yr)		2100		Assumes problem would be caught: quarterly
Total excess emissions, tpy		0.8		
Emission reduction from increased testing/monitoring, tpy		2.5		
Cost effectiveness of increased testing/monitoring ($/ton), YRS 1-5	$	265		Difference in annualized cost ($/yr) / Emission reduction (tpy)
Cost effectiveness of increased testing/monitoring ($/ton), YR 6+	$	1,822		
N'wide reporting and recordkeeping (R&R) costs:				
N'wide **baseline** R&R cost:				
One-time costs:				
Read instructions/rule (1 hr per NMPP)	$	104		
Planning/report for initial performance tests (30 hr per NMPP)	$	3,124	60.8(a) - report	
Planning/report for repeat performance tests (30 hr per NMPP, 20% fail	$	625		
Notification of construction/reconstruction (2 hr per NMPP)	$	208	60.7(a)(1)	
Notification of actual startup (2 hr per NMPP)	$	208	60.7(a)(3)	
Notification of initial performance test (2 hr per NMPP)	$	208	60.8(d)	
Notification of physical or operational change (2 hr per NMPP)	$	208	60.7(a)(4)	
Total one-time costs divided by 5 yrs ($/yr) YR 1-5	$	937		
Total one-time costs divided by 5 yrs ($/yr) YR 6+	$	-		
Annual costs:				
Records of startups, shutdowns, malfunctions, etc. (1.5 hr per NMPP)	$	156	60.7(b)	
Record monitoring data (0 hr/affected facility)	$	-		Wet scrubbers have no parameter recording frequency. Also, models based on BH or wet suppression.
Semiannual wet scrubber monitoring deviation reports	$	-	60.676(d)	Models based on baghouse or wet suppression
Total of one-time costs per year + annual costs ($/yr) YR 1-5	$	1,093		
Total of one-time costs per year + annual costs ($/yr) YR 6+	$	156		
N'wide R&R cost **under revised NSPS**:				
One-time costs				
Read instructions/rule (1 hr per NMPP)	$	104		
Planning/report for initial performance tests (30 hr per NMPP)	$	3,124	60.8(a) - report	
Planning/report for repeat performance tests (30 hr per NMPP, 25% fail	$	781		Increased fail rate to 25% for revised NSPS since compliance margin is smaller
Planning/report for repeat tests after 6+ yrs	$	-		
Planning/report for repeat tests failed after 6+ yrs (5% fail rate,	$	-		Used 5% fail rate because few should fail given the ongoing monitoring.
Notification of construction/reconstruction (2 hr per NMPP)	$	-	60.7(a)(1)	Omitted from NSPS revision
Notification of actual startup (2 hr per NMPP)	$	208	60.7(a)(3)	
Notification of initial performance test (2 hr per NMPP)	$	208	60.8(d)	
Notification of repeat performance test (2 hr per NMPP) after 6+ yrs	$	-	60.8(d)	
Notification of physical or operational change (2 hr per NMPP)	$	208	60.7(a)(4)	
Total one-time costs divided by 5 yrs ($/yr) YR 1-5	$	927		Less than baseline because notification of construction/reconstruction omitted. 5-yr repeat tests not included
Total one-time costs divided by 5 yrs ($/yr) YR 6+	$	-		Includes 5-yr repeat tests
Annual costs:				
Records of startups, shutdowns, malfunctions, etc. (1.5 hr per NMPP)	$	156	60.7(b)	
Planning/report for annual M9 tests for fugitive points with carryover/oth	$	-		16 hr/NMPP with fugitive points to be retested x 1.05 to account for 5% fail rate
Record monitoring data:				
Record water flow checks (0.1 hr/water spray/check)	$	-		
Record BH visual inspections (0.5 hr/BH/monitoring event)	$	-		
Record BH M22 readings (0.2 hr/BH/monitoring event)	$	1,000		
Semiannual wet scrubber monitoring deviation reports	$	-	60.676(d)	Models based on baghouse or wet suppression
Total of one-time costs per year + annual costs ($/yr) YR 1-5	$	2,083		
Total of one-time costs per year + annual costs ($/yr) YR 6+	$	1,156		
Diffrerence in R&R costs, $/yr YR 1-5	$	989		
Diffrerence in R&R costs, $/yr YR 6+	$	1,000		

Soda ash

Parameter	Value	Note	Reference
Typical Plant size (tph):	25		p. 5-7 of EPA-450/3-83-001a (April 1983 BID)
Model Plant No.	2		p. 5-6 of EPA-450/3-83-001a (April 1983 BID)
Gas flow to baghouses (cfm):	11500		p. 5-2 of EPA-450/3-83-001a (April 1983 BID)
	4700		
Total gas flow	16200		
Model hr/yr	8400		
PM at 0.022 gr/dscf (tpy)	12.8		
Air impacts per model:			
PM at 0.014 gr/dscf (tpy)	8.2		
Em. Red. for 0.014 (tpy)	4.7		
PM at 0.01 gr/dscf (tpy)	5.8		
Em. Red. for 0.01 (tpy)	7.0		
Nationwide air impacts:			
No. of new models projected	2		
N'wide PM at 0.022 gr/dscf (tpy)	25		
N'wide PM at 0.014 gr/dscf (tpy)	16		
N'wide em. red. for 0.014 (tpy)	9		
N'wide PM at 0.01 gr/dscf (tpy)	12		
N'wide em. red. for 0.01 (tpy)	14		
N'wide testing and monitoring costs:			
Total number of fugitive-affected facilities to be tested:	0		
No. with wet suppression sprays	0		
No. with carryover or other fugitive control	0		
Total number of stacks to be tested:	9		Based on breakout of affected facility cfm (pp.4-1 to 4-7 of EPA-450/3-82-014)
N'wide **baseline** testing/monitoring cost:			Test cost x no. new plants x no. affected facilities to be tested
Total Method 9 initial fugitive testing cost	0	C	
Total Method 5 initial stack testing cost	$ 126,000	C	
Total Method 9 initial stack testing cost	$ 23,400	C	
Total n'wide baseline testing/mont. cost:			
Capital ($), YRS 1-5	$ 149,400		
Annualized (annual costs + annualized capital), $/yr, YRS 1-5	$ 36,454		CRF at 5 yrs, 7% interest = 0.244
Capital ($), YR 6+	$ -		
Annualized (annual costs + annualized capital), $/yr, YR 6+	$ -		
N'wide testing/monitoring cost **under revised NSPS**:			
Requirements for fugitive affected facilities			
Total Method 9 initial fugitive testing cost	0	C	
Total Method 9 repeat fugitive test cost (for wet supp. only)	0	C 5 yr	
Check that water flowing for wet suppression sprays	0	A	Frequency of water checks (times/yr)= 12
Method 9 for carryover or other fugitive control	0	A	Frequency of M9 monitoring (times/yr) = 0
Requirements for stack affected facilities			
Total Method 5 initial stack testing cost	$ 126,000	C	
Total Method 9 initial stack testing cost	$ -	C	Method 9 stack opacity limit omitted for new
Total Method 5 repeat stack test cost	$ -	C 5 yr	
Total Method 9 repeat stack test cost	$ -	C 5 yr	Method 9 stack opacity limit omitted for new
Periodic visual inspections of BH	$ -	A	Frequency of visual inspections (times/yr) = 0
Periodic 30-minute M22 readings for BH's	$ 6,771	A	Frequency of 30-min M22 (times/yr) = 4
Total n'wide revised testing/mont. cost:			
Capital ($), YRS 1-5	$ 126,000		
Annualized (annual costs + annualized capital), $/yr, YRS 1-5	$ 37,515		
Capital ($), YR 6+	$ -		
Annualized (annual costs + annualized capital), $/yr, YR 6+	$ 6,771		
Difference between baseline & revised NSPS			
Capital ($), YRS 1-5	$ (23,400)		Difference due to omitted M9 for stacks. Does not include 5-yr repeat tests.
Annualized (annual costs + annualized capital), $/yr, YRS 1-5	$ 1,061		
Capital ($), YR 6+	$ -		Includes 5-yr repeat test costs
Annualized (annual costs + annualized capital), $/yr, YR 6+	$ 6,771		Includes 5-yr repeat test costs

Potential emission reduction from increased testing/monitoring on BH's				Unable to quantify benefits for wet suppression.
Excess PM from malfunctioning BHs (0.04 - 0.014), gr/dscf		0.026		Data show that 0.04 gr/dscf can be expected from malfunctioning BH (e.g., torn bags)
Excess PM from malfunctioning BH, lb/hr (x no. of plants)		0.4		Based on total model flow to BHs x no. of plants. Percent of equipment malfunctioning = 5%
Baseline testing/monitoring:				
Hours of excess emissions before noticed (1 yr x hr/yr)		8400		Assume takes 1 yr to detect problem, although could continue for longer since no testing/monitoring in current NSPS
Total excess emissions, tpy		1.5		
Revised NSPS testing/monitoring:				
Hours of excess emissions before noticed (frequency x hr/yr)		2100		Assumes problem would be caught: quarterly
Total excess emissions, tpy		0.4		
Emission reduction from increased testing/monitoring, tpy		1.1		
Cost effectiveness of increased testing/monitoring ($/ton), YRS 1-5	$	933		Difference in annualized cost ($/yr) / Emission reduction (tpy)
Cost effectiveness of increased testing/monitoring ($/ton), YR 6+	$	5,954		
N'wide reporting and recordkeeping (R&R) costs:				
N'wide **baseline** R&R cost:				
One-time costs:				
Read instructions/rule (1 hr per NMPP)	$	208		
Planning/report for initial performance tests (30 hr per NMPP)	$	6,248	60.8(a) - report	
Planning/report for repeat performance tests (30 hr per NMPP, 20% fail	$	1,250		
Notification of construction/reconstruction (2 hr per NMPP)	$	417	60.7(a)(1)	
Notification of actual startup (2 hr per NMPP)	$	417	60.7(a)(3)	
Notification of initial performance test (2 hr per NMPP)	$	417	60.8(d)	
Notification of physical or operational change (2 hr per NMPP)	$	417	60.7(a)(4)	
Total one-time costs divided by 5 yrs ($/yr) YR 1-5	$	1,874		
Total one-time costs divided by 5 yrs ($/yr) YR 6+	$	-		
Annual costs:				
Records of startups, shutdowns, malfunctions, etc. (1.5 hr per NMPP)	$	312	60.7(b)	
Record monitoring data (0 hr/affected facility)	$	-		Wet scrubbers have no parameter recording frequency. Also, models based on BH or wet suppression.
Semiannual wet scrubber monitoring deviation reports	$	-	60.676(d)	Models based on baghouse or wet suppression
Total of one-time costs per year + annual costs ($/yr) YR 1-5	$	2,187		
Total of one-time costs per year + annual costs ($/yr) YR 6+	$	312		
N'wide R&R cost **under revised NSPS**:				
One-time costs				
Read instructions/rule (1 hr per NMPP)	$	208		
Planning/report for initial performance tests (30 hr per NMPP)	$	6,248	60.8(a) - report	
Planning/report for repeat performance tests (30 hr per NMPP, 25% fail	$	1,562		Increased fail rate to 25% for revised NSPS since compliance margin is smaller
Planning/report for repeat tests after 6+ yrs	$	-		
Planning/report for repeat tests failed after 6+ yrs (5% fail rate,	$	-		Used 5% fail rate because few should fail given the ongoing monitoring.
Notification of construction/reconstruction (2 hr per NMPP)	$	-	60.7(a)(1)	Omitted from NSPS revision
Notification of actual startup (2 hr per NMPP)	$	417	60.7(a)(3)	
Notification of initial performance test (2 hr per NMPP)	$	417	60.8(d)	
Notification of repeat performance test (2 hr per NMPP) after 6+ yrs	$	-	60.8(d)	
Notification of physical or operational change (2 hr per NMPP)	$	417	60.7(a)(4)	
Total one-time costs divided by 5 yrs ($/yr) YR 1-5	$	1,854		Less than baseline because notification of construction/reconstruction omitted. 5-yr repeat tests not included
Total one-time costs divided by 5 yrs ($/yr) YR 6+	$	-		Includes 5-yr repeat tests
Annual costs:				
Records of startups, shutdowns, malfunctions, etc. (1.5 hr per NMPP)	$	312	60.7(b)	
Planning/report for annual M9 tests for fugitive points with carryover/othe	$	-		16 hr/NMPP with fugitive points to be retested x 1.05 to account for 5% fail rate
Record monitoring data:				
Record water flow checks (0.1 hr/water spray/check)	$	-		
Record BH visual inspections (0.5 hr/BH/monitoring event)	$	-		
Record BH M22 readings (0.2 hr/BH/monitoring event)	$	1,500		
Semiannual wet scrubber monitoring deviation reports	$	-	60.676(d)	Models based on baghouse or wet suppression
Total of one-time costs per year + annual costs ($/yr) YR 1-5	$	3,665		
Total of one-time costs per year + annual costs ($/yr) YR 6+	$	1,812		
Diffference in R&R costs, $/yr YR 1-5	$	1,479		
Diffference in R&R costs, $/yr YR 6+	$	1,500		

Pumice

Parameter	Value	Note	Reference	
Typical Plant size (tph):	10		p. 6-7 of EPA-450/3-83-001a (April 1983 BID)	
Model Plant No.	2		p. 6-6 of EPA-450/3-83-001a (April 1983 BID)	
Gas flow to baghouses (cfm):	10200		p. 6-2 of EPA-450/3-83-001a (April 1983 BID)	
	4000			
Total gas flow	14200			
Model hr/yr	8400			
PM at 0.022 gr/dscf (tpy)	11.2			
Air impacts per model:				
PM at 0.014 gr/dscf (tpy)	7.2			
Em. Red. for 0.014 (tpy)	4.1			
PM at 0.01 gr/dscf (tpy)	5.1			
Em. Red. for 0.01 (tpy)	6.1			
Nationwide air impacts:				
No. of new models projected	8			
N'wide PM at 0.022 gr/dscf (tpy)	90			
N'wide PM at 0.014 gr/dscf (tpy)	57			
N'wide em. red. for 0.014 (tpy)	33			
N'wide PM at 0.01 gr/dscf (tpy)	41			
N'wide em. red. for 0.01 (tpy)	49			
N'wide testing and monitoring costs:				
Total number of fugitive affected facilities to be tested:	0			
No. with wet suppression sprays	0			
No. with carryover or other fugitive control	0			
Total number of stacks to be tested:	9		Based on breakout of affected facility cfm (pp.4-1 to 4-7 of EPA-450/3-82-014)	
N'wide **baseline** testing/monitoring cost:			Test cost x no. new plants x no. affected facilities to be tested	
Total Method 9 initial fugitive testing cost	0	C		
Total Method 5 initial stack testing cost	$ 504,000	C		
Total Method 9 initial stack testing cost	$ 93,600	C		
Total n'wide baseline testing/mont. cost:				
Capital ($), YRS 1-5	$ 597,600			
Annualized (annual costs + annualized capital), $/yr, YRS 1-5	$ 145,814		CRF at 5 yrs, 7% interest = 0.244	
Capital ($), YR 6+	$ -			
Annualized (annual costs + annualized capital), $/yr, YR 6+	$ -			
N'wide testing/monitoring cost **under revised NSPS**:				
Requirements for fugitive affected facilities				
Total Method 9 initial fugitive testing cost	0	C		
Total Method 9 repeat fugitive test cost (for wet supp. only)	0	C 5 yr		
Check that water flowing for wet suppression sprays	0	A	Frequency of water checks (times/yr)=	12
Method 9 for carryover or other fugitive control	0	A	Frequency of M9 monitoring (times/yr) =	0
Requirements for stack affected facilities				
Total Method 5 initial stack testing cost	$ 504,000	C		
Total Method 9 initial stack testing cost	$ -	C	Method 9 stack opacity limit omitted for new	
Total Method 5 repeat stack test cost	$ -	C 5 yr		
Total Method 9 repeat stack test cost	$ -	C 5 yr	Method 9 stack opacity limit omitted for new	
Periodic visual inspections of BH	$ -	A	Frequency of visual inspections (times/yr) =	0
Periodic 30-minute M22 readings for BH's	$ 27,083	A	Frequency of 30-min M22 (times/yr) =	4
Total n'wide revised testing/mont. cost:				
Capital ($), YRS 1-5	$ 504,000			
Annualized (annual costs + annualized capital), $/yr, YRS 1-5	$ 150,059			
Capital ($), YR 6+	$ -		Includes repeat test costs	
Annualized (annual costs + annualized capital), $/yr, YR 6+	$ 27,083		Includes repeat test costs	
Difference between baseline & revised NSPS				
Capital ($), YRS 1-5	$ (93,600)		Difference due to omitted M9 for stacks. Does not include 5-yr repeat tests.	
Annualized (annual costs + annualized capital), $/yr, YRS 1-5	$ 4,245			
Capital ($), YR 6+	$ -		Includes 5-yr repeat test costs	
Annualized (annual costs + annualized capital), $/yr, YR 6+	$ 27,083		Includes 5-yr repeat test costs	

barrls

Potential emission reduction from increased testing/monitoring on BH's			
Excess PM from malfunctioning BHs (0.04 - 0.014), gr/dscf		0.026	
Excess PM from malfunctioning BH, lb/hr (x no. of plants)		1.3	
Baseline testing/monitoring:			
Hours of excess emissions before noticed (1 yr x hr/yr)		8400	
Total excess emissions, tpy		5.3	
Revised NSPS testing/monitoring:			
Hours of excess emissions before noticed (frequency x hr/yr)		2100	
Total excess emissions, tpy		1.3	
Emission reduction from increased testing/monitoring, tpy		4.0	
Cost effectiveness of increased testing/monitoring ($/ton), YRS 1-5	$	1,064	
Cost effectiveness of increased testing/monitoring ($/ton), YR 6+	$	6,792	
N'wide reporting and recordkeeping (R&R) costs:			
N'wide **baseline** R&R cost:			
One-time costs:			
Read instructions/rule (1 hr per NMPP)	$	833	
Planning/report for initial performance tests (30 hr per NMPP)	$	24,992	60.8(a) - report
Planning/report for repeat performance tests (30 hr per NMPP, 20% fail	$	4,998	
Notification of construction/reconstruction (2 hr per NMPP)	$	1,666	60.7(a)(1)
Notification of actual startup (2 hr per NMPP)	$	1,666	60.7(a)(3)
Notification of initial performance test (2 hr per NMPP)	$	1,666	60.8(d)
Notification of physical or operational change (2 hr per NMPP)	$	1,666	60.7(a)(4)
Total one-time costs divided by 5 yrs ($/yr) YR 1-5	$	7,498	
Total one-time costs divided by 5 yrs ($/yr) YR 6+	$	-	
Annual costs:			
Records of startups, shutdowns, malfunctions, etc. (1.5 hr per NMPP)	$	1,250	60.7(b)
Record monitoring data (0 hr/affected facility)	$	-	
Semiannual wet scrubber monitoring deviation reports	$	-	60.676(d)
Total of one-time costs per year + annual costs ($/yr) YR 1-5	$	8,747	
Total of one-time costs per year + annual costs ($/yr) YR 6+	$	1,250	
N'wide R&R cost **under revised NSPS**:			
One-time costs			
Read instructions/rule (1 hr per NMPP)	$	833	
Planning/report for initial performance tests (30 hr per NMPP)	$	24,992	60.8(a) - report
Planning/report for repeat performance tests (30 hr per NMPP, 25% fail	$	6,248	
Planning/report for repeat tests after 6+ yrs	$	-	
Planning/report for repeat tests failed after 6+ yrs (5% fail rate,	$	-	
Notification of construction/reconstruction (2 hr per NMPP)	$	-	60.7(a)(1)
Notification of actual startup (2 hr per NMPP)	$	1,666	60.7(a)(3)
Notification of initial performance test (2 hr per NMPP)	$	1,666	60.8(d)
Notification of repeat performance test (2 hr per NMPP) after 6+ yrs	$	-	60.8(d)
Notification of physical or operational change (2 hr per NMPP)	$	1,666	60.7(a)(4)
Total one-time costs divided by 5 yrs ($/yr) YR 1-5	$	7,414	
Total one-time costs divided by 5 yrs ($/yr) YR 6+	$	-	
Annual costs:			
Records of startups, shutdowns, malfunctions, etc. (1.5 hr per NMPP)	$	1,250	60.7(b)
Planning/report for annual M9 tests for fugitive points with carryoverfothe	$	-	
Record monitoring data:			
Record water flow checks (0.1 hr/water spray/check)	$	-	
Record BH visual inspections (0.5 hr/BH/monitoring event)	$	-	
Record BH M22 readings (0.2 hr/BH/monitoring event)	$	5,998	
Semiannual wet scrubber monitoring deviation reports	$	-	60.676(d)
Total of one-time costs per year + annual costs ($/yr) YR 1-5	$	14,662	
Total of one-time costs per year + annual costs ($/yr) YR 6+	$	7,248	
Difference in R&R costs, $/yr YR 1-5	$	5,915	
Difference in R&R costs, $/yr YR 6+	$	5,998	

Unable to quantify benefits for wet suppression

Data show that 0.04 gr/dscf can be expected from malfunctioning BH (e.g., torn bags)

Based on total model flow to BHs x no. of plants. Percent of equipment malfunctioning = 5%

Assume takes 1 yr to detect problem, although could continue for longer since no testing/monitoring in current NSPS

Assumes problem would be caught: quarterly

Difference in annualized cost ($/yr) / Emission reduction (tpy)

Wet scrubbers have no parameter recording frequency. Also, models based on BH or wet suppression.

Models based on baghouse or wet suppression

Increased fail rate to 25% for revised NSPS since compliance margin is smaller

Used 5% fail rate because few should fail given the ongoing monitoring

Omitted from NSPS revision

Less than baseline because notification of construction/reconstruction omitted. 5-yr repeat tests not included

Includes 5-yr repeat tests

16 hr/NMPP with fugitive points to be retested x 1.05 to account for 5% fail rate

Models based on baghouse or wet suppression

barite

Parameter	Value	Note	Reference	
Typical Plant size (tph):	10		p. 6-7 of EPA-450/3-83-001a (April 1983 BID)	
Model Plant No.	2		p. 6-6 of EPA-450/3-83-001a (April 1983 BID)	
Gas flow to baghouses (cfm):	10200		p. 6-2 of EPA-450/3-83-001a (April 1983 BID)	
	4000			
Total gas flow	14200			
Model hr/yr	5500			
PM at 0.022 gr/dscf (tpy)	7.4			
Air Impacts per model				
PM at 0.014 gr/dscf (tpy)	4.7			
Em. Red. for 0.014 (tpy)	2.7			
PM at 0.01 gr/dscf (tpy)	3.3			
Em. Red. for 0.01 (tpy)	4.0			
Nationwide air impacts				
No. of new models projected	1			
N'wide PM at 0.022 gr/dscf (tpy)	7			
N'wide PM at 0.014 gr/dscf (tpy)	5			
N'wide em. red. for 0.014 (tpy)	3			
N'wide PM at 0.01 gr/dscf (tpy)	3			
N'wide em. red. for 0.01 (tpy)	4			
N'wide testing and monitoring costs:				
Total number of fugitive affected facilities to be tested:	0			
No. with wet suppression sprays	0			
No. with carryover or other fugitive control	0			
Total number of stacks to be tested:	9		Based on breakout of affected facility cfm (pp.4-1 to 4-7 of EPA-450/3-82-014)	
N'wide **baseline** testing/monitoring cost:			Test cost x no. new plants x no. affected facilities to be tested	
Total Method 9 initial fugitive testing cost	0	C		
Total Method 5 initial stack testing cost	$ 63,000	C		
Total Method 9 initial stack testing cost	$ 11,700	C		
Total n'wide baseline testing/mont. cost:				
Capital ($), YRS 1-5	$ 74,700			
Annualized (annual costs + annualized capital), $/yr, YRS 1-5	$ 18,227		CRF at 5 yrs, 7% interest = 0.244	
Capital ($), YR 6+	$ -			
Annualized (annual costs + annualized capital), $/yr, YR 6+	$ -			
N'wide testing/monitoring cost **under revised NSPS**:				
Requirements for fugitive affected facilities				
Total Method 9 initial fugitive testing cost	0	C		
Total Method 9 repeat fugitive test cost (for wet supp. only)	0	C 5 yr		
Check that water flowing for wet suppression sprays	0	A	Frequency of water checks (times/yr)=	12
Method 9 for carryover or other fugitive control	0	A	Frequency of M9 monitoring (times/yr) =	0
Requirements for stack affected facilities				
Total Method 5 initial stack testing cost	$ 63,000	C		
Total Method 9 initial stack testing cost	$ -	C	Method 9 stack opacity limit omitted for new	
Total Method 5 repeat stack test cost	$ -	C 5 yr		
Total Method 9 repeat stack test cost	$ -	C 5 yr	Method 9 stack opacity limit omitted for new	
Periodic visual inspections of BH	$ -	A	Frequency of visual inspections [times/yr] =	0
Periodic 30-minute M22 readings for BH's	$ 3,385	A	Frequency of 30-min M22 (times/yr) =	4
Total n'wide revised testing/mont. cost:				
Capital ($), YRS 1-5	$ 63,000			
Annualized (annual costs + annualized capital), $/yr, YRS 1-5	$ 18,757			
Capital ($), YR 6+	$ -			
Annualized (annual costs + annualized capital), $/yr, YR 6+	$ 3,385			
Difference between baseline & revised NSPS				
Capital ($), YRS 1-5	$ (11,700)		Difference due to omitted M9 for stacks. Does not include 5-yr repeat tests.	
Annualized (annual costs + annualized capital), $/yr, YRS 1-5	$ 531			
Capital ($), YR 6	$ -		Includes 5-yr repeat test costs	
Annualized (annual costs + annualized capital), $/yr, YR 6	$ 3,385		Includes 5-yr repeat test costs	

Potential emission reduction from increased testing/monitoring on BH's				
Excess PM from malfunctioning BHs (0.04 - 0.014), gr/dscf		0.026		Unable to quantify benefits for wet suppression. Data show that 0.04 gr/dscf can be expected from malfunctioning BH (e.g., torn bags)
Excess PM from malfunctioning BH, lb/hr (x no. of plants)		0.2		Based on total model flow to BHs x no. of plants. Percent of equipment malfunctioning = 5%
Baseline testing/monitoring:				
Hours of excess emissions before noticed (1 yr x hr/yr)		5500		Assume takes 1 yr to detect problem, although could continue for longer since no testing/monitoring in current NSPS
Total excess emissions, tpy		0.4		
Revised NSPS testing/monitoring:				
Hours of excess emissions before noticed (frequency x hr/yr)		1375		Assumes problem would be caught: quarterly
Total excess emissions, tpy		0.1		
Emission reduction from increased testing/monitoring, tpy		0.3		
Cost effectiveness of increased testing/monitoring ($/ton), YRS 1-5	$	1,626		Difference in annualized cost ($/yr) / Emission reduction (tpy)
Cost effectiveness of increased testing/monitoring ($/ton), YR 6+	$	10,374		
N'wide reporting and recordkeeping (R&R) costs:				
N'wide **baseline** R&R cost:				
One-time costs:				
Read instructions/rule (1 hr per NMPP)	$	104		
Planning/report for initial performance tests (30 hr per NMPP)	$	3,124	60.8(a) - report	
Planning/report for repeat performance tests (30 hr per NMPP, 20% fail	$	625		
Notification of construction/reconstruction (2 hr per NMPP)	$	208	60.7(a)(1)	
Notification of actual startup (2 hr per NMPP)	$	208	60.7(a)(3)	
Notification of initial performance test (2 hr per NMPP)	$	208	60.8(d)	
Notification of physical or operational change (2 hr per NMPP)	$	208	60.7(a)(4)	
Total one-time costs divided by 5 yrs ($/yr) YR 1-5	$	937		
Total one-time costs divided by 5 yrs ($/yr) YR 6+	$	-		
Annual costs:				
Records of startups, shutdowns, malfunctions, etc. (1.5 hr per NMPP)	$	156	60.7(b)	
Record monitoring data (0 hr/affected facility)	$	-		Wet scrubbers have no parameter recording frequency. Also, models based on BH or wet suppression.
Semiannual wet scrubber monitoring deviation reports	$	-	60.676(d)	Models based on baghouse or wet suppression
Total of one-time costs per year + annual costs ($/yr) YR 1-5	$	1,093		
Total of one-time costs per year + annual costs ($/yr) YR 6+	$	156		
N'wide R&R cost **under revised NSPS**				
One-time costs				
Read instructions/rule (1 hr per NMPP)	$	104		
Planning/report for initial performance tests (30 hr per NMPP)	$	3,124	60.8(a) - report	
Planning/report for repeat performance tests (30 hr per NMPP, 25% fail	$	781		Increased fail rate to 25% for revised NSPS since compliance margin is smaller
Planning/report for repeat tests after 6+ yrs	$	-		
Planning/report for repeat tests failed after 6+ yrs (5% fail rate,	$	-		Used 5% fail rate because few should fail given the ongoing monitoring.
Notification of construction/reconstruction (2 hr per NMPP)	$	-	60.7(a)(1)	Omitted from NSPS revision
Notification of actual startup (2 hr per NMPP)	$	208	60.7(a)(3)	
Notification of initial performance test (2 hr per NMPP)	$	208	60.8(d)	
Notification of repeat performance test (2 hr per NMPP) after 6+ yrs	$	-	60.8(d)	
Notification of physical or operational change (2 hr per NMPP)	$	208	60.7(a)(4)	
Total one-time costs divided by 5 yrs ($/yr) YR 1-5	$	927		Less than baseline because notification of construction/resonstruction omitted. 5-yr repeat tests not included
Total one-time costs divided by 5 yrs ($/yr) YR 6+	$	-		Includes 5-yr repeat tests
Annual costs:				
Records of startups, shutdowns, malfunctions, etc. (1.5 hr per NMPP)	$	156	60.7(b)	
Planning/report for annual M9 tests for fugitive points with carryover/othe	$	-		16 hr/NMPP with fugitive points to be retested x 1.05 to account for 5% fail rate
Record monitoring data:				
Record water flow checks (0.1 hr/water spray/check)	$	-		
Record BH visual inspections (0.5 hr/BH/monitoring event)	$	-		
Record BH M22 readings (0.2 hr/BH/monitoring event)	$	750		
Semiannual wet scrubber monitoring deviation reports	$	-	60.676(d)	Models based on baghouse or wet suppression
Total of one-time costs per year + annual costs ($/yr) YR 1-5	$	1,833		
Total of one-time costs per year + annual costs ($/yr) YR 6+	$	906		
Difference in R&R costs, $/yr YR 1-5	$	739		
Difference in R&R costs, $/yr YR 6+	$	750		

Parameter	Value	Note	Reference	
Typical Plant size (tph):	10		p. 6-7 of EPA-450/3-83-001a (April 1983 BID)	
Model Plant No.	2		p. 6-6 of EPA-450/3-83-001a (April 1983 BID)	
Gas flow to baghouses (cfm)	10200		p. 6-2 of EPA-450/3-83-001a (April 1983 BID)	
	4000			
Total gas flow	14200			
Model hr/yr	8400			
PM at 0.022 gr/dscf (tpy)	11.2			
Air impacts per model:				
PM at 0.014 gr/dscf (tpy)	7.2			
Em. Red. for 0.014 (tpy)	4.1			
PM at 0.01 gr/dscf (tpy)	5.1			
Em. Red. for 0.01 (tpy)	6.1			
Nationwide air impacts:				
No. of new models projected	1			
N'wide PM at 0.022 gr/dscf (tpy)	11			
N'wide PM at 0.014 gr/dscf (tpy)	7			
N'wide em. red. for 0.014 (tpy)	4			
N'wide PM at 0.01 gr/dscf (tpy)	6			
N'wide em. red. for 0.01 (tpy)	6			
N'wide testing and monitoring costs:				
Total number of fugitive affected facilities to be tested:	0			
No. with wet suppression sprays	0			
No. with carryover or other fugitive control	0			
Total number of stacks to be tested:	9		Based on breakout of affected facility cfm (pp.4-1 to 4-7 of EPA-450/3-82-014)	
N'wide **baseline** testing/monitoring cost:			Test cost x no. new plants x no. affected facilities to be tested	
Total Method 9 initial fugitive testing cost	0	C		
Total Method 5 initial stack testing cost	$ 63,000	C		
Total Method 9 initial stack testing cost	$ 11,700	C		
Total n'wide baseline testing/mont. cost:				
Capital ($), YRS 1-5	$ 74,700			
Annualized (annual costs + annualized capital), $/yr, YRS 1-5	$ 18,227		CRF at 5 yrs, 7% interest = 0.244	
Capital ($), YR 6+	$ -			
Annualized (annual costs + annualized capital), $/yr, YR 6+	$ -			
N'wide testing/monitoring cost **under revised NSPS**:				
Requirements for fugitive affected facilities				
Total Method 9 initial fugitive testing cost	0	C		
Total Method 9 repeat fugitive test cost (for wet supp. only)	0	C 5 yr		
Check that water flowing for wet suppression sprays	0	A	Frequency of water checks (times/yr)=	12
Method 9 for carryover or other fugitive control	0	A	Frequency of M9 monitoring (times/yr) =	0
Requirements for stack affected facilities				
Total Method 5 initial stack testing cost	$ 63,000	C		
Total Method 9 initial stack testing cost	$ -	C	Method 9 stack opacity limit omitted for new	
Total Method 5 repeat stack test cost	$ -	C 5 yr		
Total Method 9 repeat stack test cost	$ -	C 5 yr	Method 9 stack opacity limit omitted for new	
Periodic visual inspections of BH	$ -	A	Frequency of visual inspections (times/yr) =	0
Periodic 30-minute M22 readings for BH's	$ 3,385	A	Frequency of 30-min M22 (times/yr) =	4
Total n'wide revised testing/mont. cost:				
Capital ($), YRS 1-5	$ 63,000			
Annualized (annual costs + annualized capital), $/yr, YRS 1-5	$ 18,757			
Capital ($), YR 6+	$ -			
Annualized (annual costs + annualized capital), $/yr, YR 6+	$ 3,385			
Difference between baseline & revised NSPS				
Capital ($), YRS 1-5	$ (11,700)		Difference due to omitted M9 for stacks. Does not include 5-yr repeat tests.	
Annualized (annual costs + annualized capital), $/yr, YRS 1-5	$ 531			
Capital ($), YR 6+	$ -		Includes 5-yr repeat test costs	
Annualized (annual costs + annualized capital), $/yr, YR 6+	$ 3,385		Includes 5-yr repeat test costs	

Potential emission reduction from increased testing/monitoring on BH's				
Excess PM from malfunctioning BHs (0.04 - 0.014), gr/dscf		0.026		Unable to quantify benefits for wet suppression. Data show that 0.04 gr/dscf can be expected from malfunctioning BH (e.g., torn bags)
Excess PM from malfunctioning BH, lb/hr (x no. of plants)		0.2		Based on total model flow to BHs x no. of plants. Percent of equipment malfunctioning = 5%
Baseline testing/monitoring:				
Hours of excess emissions before noticed (1 yr x hr/yr)		8400		Assume takes 1 yr to detect problem, although could continue for longer since no testing/monitoring in current NSPS
Total excess emissions, tpy		0.7		
Revised NSPS testing/monitoring:				
Hours of excess emissions before noticed (frequency x hr/yr)		2100		Assumes problem would be caught: quarterly
Total excess emissions, tpy		0.2		
Emission reduction from increased testing/monitoring, tpy		0.5		
Cost effectiveness of increased testing/monitoring ($/ton), YRS 1-5	$	1,064		Difference in annualized cost ($/yr) / Emission reduction (tpy)
Cost effectiveness of increased testing/monitoring ($/ton), YR 6+	$	6,792		
N'wide reporting and recordkeeping (R&R) costs:				
N'wide **baseline** R&R cost:				
One-time costs:				
Read instructions/rule (1 hr per NMPP)	$	104		
Planning/report for initial performance tests (30 hr per NMPP)	$	3,124	60.8(a) - report	
Planning/report for repeat performance tests (30 hr per NMPP, 20% fail	$	625		
Notification of construction/reconstruction (2 hr per NMPP)	$	208	60.7(a)(1)	
Notification of actual startup (2 hr per NMPP)	$	208	60.7(a)(3)	
Notification of initial performance test (2 hr per NMPP)	$	208	60.8(d)	
Notification of physical or operational change (2 hr per NMPP)	$	208	60.7(a)(4)	
Total one-time costs divided by 5 yrs ($/yr) YR 1-5	$	937		
Total one-time costs divided by 5 yrs ($/yr) YR 6+	$	-		
Annual costs:				
Records of startups, shutdowns, malfunctions, etc. (1.5 hr per NMPP)	$	156	60.7(b)	
Record monitoring data (0 hr/affected facility)	$	-		Wet scrubbers have no parameter recording frequency. Also, models based on BH or wet suppression.
Semiannual wet scrubber monitoring deviation reports	$	-	60.676(d)	Models based on baghouse or wet suppression
Total of one-time costs per year + annual costs ($/yr) YR 1-5	$	1,093		
Total of one-time costs per year + annual costs ($/yr) YR 6+	$	156		
N'wide R&R cost **under revised NSPS**:				
One-time costs				
Read instructions/rule (1 hr per NMPP)	$	104		
Planning/report for initial performance tests (30 hr per NMPP)	$	3,124	60.8(a) - report	
Planning/report for repeat performance tests (30 hr per NMPP, 25% fail	$	781		Increased fail rate to 25% for revised NSPS since compliance margin is smaller
Planning/report for repeat tests after 6+ yrs	$	-		
Planning/report for repeat tests failed after 6+ yrs (5% fail rate,	$	-		Used 5% fail rate because few should fail given the ongoing monitoring
Notification of construction/reconstruction (2 hr per NMPP)	$	-	60.7(a)(1)	Omitted from NSPS revision
Notification of actual startup (2 hr per NMPP)	$	208	60.7(a)(3)	
Notification of initial performance test (2 hr per NMPP)	$	208	60.8(d)	
Notification of repeat performance test (2 hr per NMPP) after 6+ yrs	$	-	60.8(d)	
Notification of physical or operational change (2 hr per NMPP)	$	208	60.7(a)(4)	
Total one-time costs divided by 5 yrs ($/yr) YR 1-5	$	927		Less than baseline because notification of construction/reconstruction omitted. 5-yr repeat tests not included
Total one-time costs divided by 5 yrs ($/yr) YR 6+	$	-		Includes 5-yr repeat tests
Annual costs:				
Records of startups, shutdowns, malfunctions, etc. (1.5 hr per NMPP)	$	156	60.7(b)	
Planning/report for annual M9 tests for fugitive points with carryover/oth	$	-		16 hr/NMPP with fugitive points to be retested x 1.05 to account for 5% fail rate
Record monitoring data:				
Record water flow checks (0.1 hr/water spray/check)	$	-		
Record BH visual inspections (0.5 hr/BH/monitoring event)	$	-		
Record BH M22 readings (0.2 hr/BH/monitoring event)	$	750		
Semiannual wet scrubber monitoring deviation reports	$	-	60.676(d)	Models based on baghouse or wet suppression
Total of one-time costs per year + annual costs ($/yr) YR 1-5	$	1,833		
Total of one-time costs per year + annual costs ($/yr) YR 6+	$	906		
Difference in R&R costs, $/yr YR 1-5	$	739		
Difference in R&R costs, $/yr YR 6+	$	750		

Attachment 1B: Summaries of Other Testing/Monitoring Options Considered

ATTACHMENT 1B

Variations in stack testing and monitoring costs

Variation	Initial testing	Repeat testing	Monitoring	Additional annualized cost per plant ($/yr)*	
				Yr 1-5:	Yr 6+:
1	Initial M5. Omit M9.	Annual M5	Quarterly 30-min M22.	68 - 89K	71 - 93K
2	Initial M5. Omit M9.	Repeat M5 every 5 yrs.	Quarterly 30-min M22.	1 - 2K	20 - 27K
3	Initial M5. Omit M9.	Repeat M5 every 5 yrs for stacks 2500 acfm and greater	Quarterly 30-min M22.	1 - 2K	8 - 27K
Selected Option	Initial M5. Omit M9.	No repeat tests	Quarterly 30-min M22.	1 - 2K	4 - 6K
5	Initial M5. Omit M9.	No repeat tests	Monthly 30-min M22.	10 - 13K	12 - 17K
6	Initial M5 and M9.	Repeat M5 every 5 yrs for stacks 2500 acfm and greater. Repeat M9 annually.	Semi-annual 30-min M22.	16 - 20K	19 - 41K

Variations in fugitive testing and monitoring costs

Variation	Initial testing	Repeat testing	Monitoring	Additional annualized cost per plant ($/yr)*	
				Yr 1-5:	Yr 6+:
A	Initial M9	Annual M9 for all	Monthly water flow check for water sprays.	8K	10K
B	Initial M9	M9 repeated every 5 yrs for all affected facilities	Daily water flow check for water sprays.	64K	67K
C	Initial M9	M9 repeated every 5 yrs for all affected facilities	Weekly water flow check for water sprays.	12K	15K
D	Initial M9	M9 repeated every 5 yrs for all affected facilities	Monthly water flow check for water sprays.	2K	5K
E	Initial M9	Annual M9 for affected facilities without water sprays (i.e., with carryover/other fugitive control).	Monthly water flow check for water sprays.	6K	7K
Selected Option	Initial M9	M9 every 5 years for affected facilities without water sprays (i.e., with carryover/other fugitive control).	Monthly water flow check for water sprays.	2K	5K
G	Initial M9	No repeat tests	Monthly water flow check for water sprays.	2K	3K

*Annualized initial test costs occur in years 1-5. Any annualized 5-yr repeat test costs would occur in year 6+. Annual test costs would occur every year.

Fugitive Testing: Initial M9
Fugitive Monitoring: Monthly water flow check for water sprays
Repeat (every 5 yrs) M9 for affected facilities with carryover/other fugitive control

Stack Testing: Initial M5. Cmlt M9. Annual M5.
Stack (BH) Monitoring: Quarterly 30-min M22.

SCENARIO: Stack variation 1

Summary of Nationwide Testing, Monitoring, Reporting, and Recordkeeping Costs for Subpart OOO (Years 1-5)

Mineral type	No. new model plants	Baseline capital cost	Baseline annualized cost	Post-revision capital cost	Post-revision annualized cost	Difference in capital cost	Difference in annualized cost	Potential emission reduction,* tpy	Potential cost effectiveness ($/ton)	Difference in annualized cost per plant
Crushed & Broken stone	96	$ 915,200	$ 326,275	$ 457,600	$ 516,134	$ (457,600)	$ 187,860	111	$ 1,692	$ 1,957
Sand & Gravel:										
Construction	208	$ 1,982,933	$ 711,282	$ 991,467	$ 1,118,291	$ (991,467)	$ 407,029	241	$ 1,692	$ 1,957
Industrial	1	$ 9,533	$ 3,420	$ 4,767	$ 5,376	$ (4,767)	$ 1,957	1	$ 3,384	$ 1,957
Clays:										
Kaolin	None									
Fireclay	None									
Bentonite	1	$ 74,700	$ 19,320	$ 93,000	$ 86,870	$ (11,700)	$ 67,550	1	$ 118,797	$ 67,550
Fuller's earth	4	$ 298,800	$ 77,281	$ 252,000	$ 347,481	$ (46,800)	$ 270,200	2	$ 118,797	$ 67,550
Ball Clay	1	$ 74,700	$ 19,320	$ 93,000	$ 86,870	$ (11,700)	$ 67,550	1	$ 118,797	$ 67,550
Common Clay	None									
Rock Salt/Sodium Chloride	1	$ 74,700	$ 19,320	$ 93,000	$ 86,870	$ (11,700)	$ 67,550	1	$ 118,797	$ 67,550
Gypsum	7	$ 522,900	$ 135,241	$ 441,000	$ 606,092	$ (81,900)	$ 472,851	4	$ 118,797	$ 67,550
Sodium Carbonate	1	$ 99,600	$ 25,396	$ 84,000	$ 114,373	$ (15,600)	$ 88,977	2	$ 35,906	$ 88,977
Sodium sulfate	None									
Pumice	2	$ 149,400	$ 38,640	$ 126,000	$ 173,741	$ (23,400)	$ 135,100	1	$ 118,797	$ 67,550
Gilsonite	None									
Talc and Pyrophyllite	None									
Boron	None									
Barite	8	$ 597,600	$ 154,562	$ 504,000	$ 694,962	$ (93,600)	$ 540,401	4	$ 135,528	$ 67,550
Fluorspar	1	$ 74,700	$ 19,320	$ 93,000	$ 86,870	$ (11,700)	$ 67,550	0	$ 206,969	$ 67,550
Feldspar	None									
Diatomite	None									
Perlite	None									
Vermiculite	None									
Mica	1	$ 74,700	$ 19,320	$ 93,000	$ 86,870	$ (11,700)	$ 67,550	0	$ 135,528	$ 67,550
Kyanite	None									
Total	332	$ 4,949,467	$ 1,570,676	$ 3,175,833	$ 4,012,802	$ (1,773,633)	$ 2,442,125	369	$ 6,626	$ 7,356
								334	7303	
								Mg/yr	$/Mg	

*Potential emission reduction associated with increased testing and monitoring (based on potential emissions from malfunctioning controls)

Fugitive Testing: Initial M9
Fugitive Monitoring: Monthly water flow check for water sprays
Repeat (every 5 yrs) M9 for affected facilities with carryover/other fugitive control

Stack Testing: Initial M5. Omit M9. Annual M5.
Stack (BH) Monitoring: Quarterly 30-min M22.

SCENARIO: **Stack variation 1**

Summary of Nationwide Testing, Monitoring, Reporting, and Recordkeeping Costs for Subpart OOO (Year 8+)

Mineral type	No. new model plants	Baseline capital cost	Baseline annualized cost	Post-revision capital cost	Post-revision annualized cost	Difference in capital cost	Difference in annualized cost	Potential emission reduction,* tpy	Potential cost effectiveness ($/ton)	Difference in annualized cost per plant
Crushed & Broken stone	96	-	14,995	249,600	443,389	$ 249,600	$ 428,394	111	$ 3,856	$ 4,462
Sand & Gravel										
Construction	208	-	32,489	540,800	960,677	$ 540,800	$ 928,188	241	$ 3,856	$ 4,462
Industrial	1	-	156	2,600	4,619	$ 2,600	$ 4,462	1	$ 7,716	$ 4,462
Clays										
Kaolin	None									
Fireclay	None									
Bentonite	1	-	156	-	70,572	$ -	$ 70,415	1	$ 123,835	$ 70,415
Fuller's earth	4	-	625	-	282,286	$ -	$ 281,661	2	$ 123,835	$ 70,415
Ball Clay	1	-	156	-	70,572	$ -	$ 70,415	1	$ 123,835	$ 70,415
Common Clay	None									
Rock Salt/Sodium Chloride	1	-	156	-	70,572	$ -	$ 70,415	1	$ 123,835	$ 70,415
Gypsum	7	-	1,093	-	494,001	$ -	$ 492,907	4	$ 123,835	$ 70,415
Sodium Carbonate	1	-	156	-	92,950	$ -	$ 92,794	2	$ 37,446	$ 92,794
Sodium sulfate	None									
Pumice	2	-	312	-	141,143	$ -	$ 140,831	1	$ 123,835	$ 70,415
Gilsonite	None									
Talc and Pyrophyllite	None									
Boron	None									
Barite	8	-	1,250	-	564,572	$ -	$ 563,322	4	$ 141,277	$ 70,415
Fluorspar	1	-	156	-	70,572	$ -	$ 70,415	0	$ 215,789	$ 70,415
Feldspar	None									
Diatomite	None									
Perlite	None									
Vermiculite	None									
Mica	1	-	156	-	70,572	$ -	$ 70,415	0	$ 141,277	$ 70,415
Kyanite	None									
Total	332	$ -	$ 51,858	$ 793,000	$ 3,336,464	$ 793,000	$ 3,284,606	369	$ 8,911	$ 9,893

*Potential emission reduction associated with increased testing and monitoring (based on potential emissions from malfunctioning controls)

334 Mg/yr

9623 $/Mg

Fugitive Testing: Initial M9
Fugitive Monitoring: Monthly water flow check for water sprays
Repeat (every 5 yrs) M9 for affected facilities with carryover/other fugitive control

Stack Testing: Initial M5. Omit M9. Repeat M5 every 5 yrs.
Stack (BH) Monitoring: Quarterly 30-min M22.

SCENARIO: Stack variation 2

Summary of Nationwide Testing, Monitoring, Reporting, and Recordkeeping Costs for Subpart OOO (Years 1-5)

Mineral type	No. new model plants	Baseline capital cost	Baseline annualized cost	Post-revision capital cost	Post-revision annualized cost	Difference in capital cost	Difference in annualized cost	Potential emission reduction,* tpy	Potential cost effectiveness ($/ton)	Difference in annualized cost per plant
Crushed & Broken stone	96	$ 915,200	$ 328,275	$ 457,600	$ 516,134	$ (457,600)	$ 187,860	111	$ 1,692	$ 1,957
Sand & Gravel										
Construction	208	$ 1,982,933	$ 711,262	$ 991,467	$ 1,118,291	$ (991,467)	$ 407,029	241	$ 1,692	$ 1,957
Industrial	1	$ 9,533	$ 3,420	$ 4,767	$ 5,376	$ (4,767)	$ 1,957	1	$ 3,384	$ 1,957
Clays:										
Kaolin	None									
Fireclay	None									
Bentonite	1	$ 74,700	$ 19,320	$ 63,000	$ 20,590	$ (11,700)	$ 1,270	1	$ 2,233	$ 1,270
Fuller's earth	4	$ 298,800	$ 77,281	$ 252,000	$ 82,360	$ (46,800)	$ 5,080	2	$ 2,233	$ 1,270
Ball Clay	1	$ 74,700	$ 19,320	$ 63,000	$ 20,590	$ (11,700)	$ 1,270	1	$ 2,233	$ 1,270
Common Clay	None									
Rock Salt/Sodium Chloride	1	$ 74,700	$ 19,320	$ 63,000	$ 20,590	$ (11,700)	$ 1,270	1	$ 2,233	$ 1,270
Gypsum	7	$ 522,900	$ 135,241	$ 441,000	$ 144,131	$ (81,900)	$ 8,889	4	$ 2,233	$ 1,270
Sodium Carbonate	1	$ 99,600	$ 25,386	$ 84,000	$ 27,092	$ (15,600)	$ 1,697	2	$ 685	$ 1,697
Sodium sulfate	None									
Pumice	2	$ 148,400	$ 38,640	$ 126,000	$ 41,180	$ (23,400)	$ 2,540	1	$ 2,233	$ 1,270
Gilsonite	None									
Talc and Pyrophyllite	None									
Boron	None									
Barite	8	$ 597,600	$ 154,562	$ 504,000	$ 164,721	$ (93,600)	$ 10,159	4	$ 2,548	$ 1,270
Fluorspar	1	$ 74,700	$ 19,320	$ 63,000	$ 20,590	$ (11,700)	$ 1,270	0	$ 3,891	$ 1,270
Feldspar	None									
Diatomite	None									
Perlite	None									
Vermiculite	None									
Mica	1	$ 74,700	$ 19,320	$ 63,000	$ 20,590	$ (11,700)	$ 1,270	0	$ 2,548	$ 1,270
Kyanite	None									
Total	332	$ 4,949,467	$ 1,570,678	$ 3,175,833	$ 2,202,237	$ (1,773,633)	$ 631,560	369	$ 1,713	$ 1,902
								334 Mg/yr	1689 $/Mg	

*Potential emission reduction associated with increased testing and monitoring (based on potential emissions from malfunctioning controls)

Fugitive Testing: Initial M9
Fugitive Monitoring: Monthly water flow check for water sprays
Repeat (every 5 yrs) M9 for affected facilities with carryover/other fugitive control

Stack Testing: Initial M5. Omit M9. Repeat M5 every 5 yrs.
Stack (BH) Monitoring: Quarterly 30-min M22.

SCENARIO: Stack variation 2

Summary of Nationwide Testing, Monitoring, Reporting, and Recordkeeping Costs for Subpart OOO (Year 6+)

Mineral type	No. new model plants	Baseline capital cost	Baseline annualized cost	Post-revision capital cost	Post-revision annualized cost	Difference in capital cost	Difference in annualized cost	Potential emission reduction,* tpy	Potential cost effectiveness ($/ton)	Difference in annualized cost per plant
Crushed & Broken stone	96	-	14,969	249,600	443,388	$ 249,600	$ 428,394	111	$ 3,856	$ 4,462
Sand & Gravel:										
Construction	208	-	32,489	540,800	960,677	$ 540,800	$ 928,188	241	$ 3,856	$ 4,462
Industrial	1	-	155	2,600	4,619	$ 2,600	$ 4,462	1	$ 7,716	$ 4,462
Clays:										
Kaolin	None									
Fireclay	None									
Bentonite	1	-	156	63,000	20,319	$ 63,000	$ 20,163	1	$ 35,460	$ 20,163
Fuller's earth	4	-	625	252,000	81,277	$ 252,000	$ 80,653	2	$ 35,460	$ 20,163
Ball Clay	1	-	156	63,000	20,319	$ 63,000	$ 20,163	1	$ 35,460	$ 20,163
Common Clay	None									
Rock Salt/Sodium Chloride	1	-	156	63,000	20,319	$ 63,000	$ 20,163	1	$ 35,460	$ 20,163
Gypsum	7	-	1,093	441,000	142,236	$ 441,000	$ 141,142	4	$ 35,460	$ 20,163
Sodium Carbonate	1	-	156	84,000	26,822	$ 84,000	$ 26,666	2	$ 10,761	$ 26,666
Sodium sulfate	None									
Pumice	2	-	312	126,000	40,639	$ 126,000	$ 40,326	1	$ 35,460	$ 20,163
Gilsonite	None									
Talc and Pyrophyllite	None									
Boron	None									
Barite	8	-	1,250	504,000	162,555	$ 504,000	$ 161,305	4	$ 40,454	$ 20,163
Fluorspar	1	-	156	63,000	20,319	$ 63,000	$ 20,163	0	$ 61,785	$ 20,163
Feldspar	None									
Diatomite	None									
Perlite	None									
Vermiculite	None									
Mica	1	-	156	63,000	20,319	$ 63,000	$ 20,163	0	$ 40,454	$ 20,163
Kyanite	None									
Total	332	$ -	$ 51,858	$ 2,515,000	$ 1,983,810	$ 2,515,000	$ 1,911,852	369	$ 5,187	$ 5,759
								334 Mg/yr	5718 $/Mg	

*Potential emission reduction associated with increased testing and monitoring (based on potential emissions from malfunctioning controls)

Fugitive Testing: Initial M9
Fugitive Monitoring: Monthly water flow check for water sprays
Repeat (every 5 yrs) M9 for affected facilities with carryover/other fugitive control

Stack Testing: Initial M5. Omit M9. Repeat M5 every 5 yrs for stacks >=2500 acfm.
Stack (BH) Monitoring: Quarterly 30-min M22.

SCENARIO: **Stack variation 3**

Summary of Nationwide Testing, Monitoring, Reporting, and Recordkeeping Costs for Subpart OOO (Years 1-5)

Mineral type	No. new model plants	Baseline capital cost	Baseline annualized cost	Post-revision capital cost	Post-revision annualized cost	Difference in capital cost	Difference in annualized cost	Potential emission reduction,* tpy	Potential cost effectiveness ($/ton)	Difference in annualized cost per plant
Crushed & Broken stone	96	$ 915,200	$ 328,275	$ 457,600	$ 516,134	$ (457,600)	$ 187,860	111	$ 1,692	$ 1,957
Sand & Gravel										
Construction	208	$ 1,982,933	$ 711,262	$ 991,467	$ 1,118,291	$ (991,467)	$ 407,029	241	$ 1,692	$ 1,957
Industrial	1	$ 9,533	$ 3,420	$ 4,767	$ 5,376	$ (4,767)	$ 1,957	1	$ 3,384	$ 1,957
Clays:										
Kaolin	None									
Fireclay	None									
Bentonite	1	$ 74,700	$ 19,320	$ 63,000	$ 20,590	$ (11,700)	$ 1,270	1	$ 2,233	$ 1,270
Fuller's earth	4	$ 298,800	$ 77,281	$ 252,000	$ 82,360	$ (46,800)	$ 5,080	2	$ 2,233	$ 1,270
Ball Clay	1	$ 74,700	$ 19,320	$ 63,000	$ 20,590	$ (11,700)	$ 1,270	1	$ 2,233	$ 1,270
Common Clay	None									
Rock Salt/Sodium Chloride	1	$ 74,700	$ 19,320	$ 63,000	$ 20,590	$ (11,700)	$ 1,270	1	$ 2,233	$ 1,270
Gypsum	7	$ 522,900	$ 135,241	$ 441,000	$ 144,131	$ (81,900)	$ 8,889	4	$ 2,233	$ 1,270
Sodium Carbonate	1	$ 99,600	$ 25,986	$ 84,000	$ 27,092	$ (15,600)	$ 1,697	2	$ 685	$ 1,697
Sodium sulfate	None									
Pumice	2	$ 149,400	$ 38,640	$ 126,000	$ 41,180	$ (23,400)	$ 2,540	1	$ 2,233	$ 1,270
Gilsonite	None									
Talc and Pyrophyllite	None									
Boron	None									
Barite	8	$ 597,600	$ 154,562	$ 504,000	$ 164,721	$ (93,600)	$ 10,159	4	$ 2,546	$ 1,270
Fluorspar	1	$ 74,700	$ 19,320	$ 63,000	$ 20,590	$ (11,700)	$ 1,270	0	$ 3,891	$ 1,270
Feldspar	None									
Diatomite	None									
Perlite	None									
Vermiculite	None									
Mica	1	$ 74,700	$ 19,320	$ 63,000	$ 20,590	$ (11,700)	$ 1,270	0	$ 2,546	$ 1,270
Kyanite	None									
Total	332	$ 4,949,467	$ 1,570,676	$ 3,175,833	$ 2,202,237	$ (1,773,633)	$ 631,560	369	$ 1,713	$ 1,902
								334 Mg/yr	1889 $/Mg	

*Potential emission reduction associated with increased testing and monitoring (based on potential emissions from malfunctioning controls)

Fugitive Testing: Initial M9
Fugitive Monitoring: Monthly water flow check for water sprays
Repeat (every 5 yrs) M9 for affected facilities with carryover/other fugitive control

Stack Testing: Initial M5. Omit M9. Repeat M5 every 5 yrs for stacks >=2500 acfm.
Stack (BH) Monitoring: Quarterly 30-min M22.

SCENARIO: Stack variation 3

Summary of Nationwide Testing, Monitoring, Reporting, and Recordkeeping Costs for Subpart OOO (Year 6+)

Mineral type	No. new model plants	Baseline capital cost	Baseline annualized cost	Post-revision capital cost	Post-revision annualized cost	Difference in capital cost	Difference in annualized cost	Potential emission reduction,* tpy	Potential cost effectiveness ($/ton)	Difference in annualized cost per plant
Crushed & Broken stone	96	-	14,985	249,600	443,389	$ 249,600	$ 428,394	111	$ 3,856	$ 4,462
Sand & Gravel										
Construction	208	-	32,489	540,800	960,677	$ 540,800	$ 928,188	241	$ 3,856	$ 4,462
Industrial	1	-	156	2,600	4,619	$ 2,600	$ 4,462	1	$ 7,716	$ 4,462
Clays:										
Kaolin	None									
Fireclay	None									
Bentonite	1	-	156	14,000	8,363	$ 14,000	$ 8,207	1	$ 14,433	$ 8,207
Fuller's earth	4	-	625	56,000	33,453	$ 56,000	$ 32,829	2	$ 14,433	$ 8,207
Ball Clay	1	-	156	14,000	8,363	$ 14,000	$ 8,207	1	$ 14,433	$ 8,207
Common Clay	None									
Rock Salt/Sodium Chloride	1	-	156	14,000	8,363	$ 14,000	$ 8,207	1	$ 14,433	$ 8,207
Gypsum	7	-	1,093	98,000	58,544	$ 98,000	$ 57,450	4	$ 14,433	$ 8,207
Sodium Carbonate	1	-	156	84,000	28,822	$ 84,000	$ 28,666	2	$ 10,761	$ 28,666
Sodium sulfate	None									
Pumice	2	-	312	28,000	16,727	$ 28,000	$ 16,414	1	$ 14,433	$ 8,207
Gilsonite	None									
Talc and Pyrophyllite	None									
Boron	None									
Barite	8	-	1,250	112,000	66,907	$ 112,000	$ 65,657	4	$ 16,466	$ 8,207
Fluorspar	1	-	156	14,000	8,363	$ 14,000	$ 8,207	0	$ 25,149	$ 8,207
Feldspar	None									
Diatomite	None									
Perlite	None									
Vermiculite	None									
Mica	1	-	156	14,000	8,363	$ 14,000	$ 8,207	0	$ 16,466	$ 8,207
Kyanite	None									
Total	332	$ -	$ 51,898	$ 1,241,000	$ 1,652,954	$ 1,241,000	$ 1,601,096	369	$ 4,344	$ 4,823

*Potential emission reduction associated with increased testing and monitoring (based on potential emissions from malfunctioning controls)

334 Mg/yr

4788 $/Mg

Fugitive Testing: Initial M9
Fugitive Monitoring: Monthly water flow check for water sprays
Repeat (every 5 yrs) M9 for affected facilities with carryover/other fugitive control

Stack Testing: Initial M5 Omit M9. No repeat tests.
Stack (BH) Monitoring: Monthly 30-min M22.

SCENARIO: **Stack variation 5**

Summary of Nationwide Testing, Monitoring, Reporting, and Recordkeeping Costs for Subpart OOO (Years 1-5)

Mineral type	No. new model plants	Baseline capital cost	Baseline annualized cost	Post-revision capital cost	Post-revision annualized cost	Difference in capital cost	Difference in annualized cost	Potential emission reduction,* tpy	Potential cost effectiveness ($/ton)	Difference in annualized cost per plant
Crushed & Broken stone	96	$ 915,200	$ 328,279	$ 457,600	$ 516,134	$ (457,600)	$ 187,860	111	$ 1,692	$ 1,957
Sand & Gravel:										
Construction	238	$ 1,982,933	$ 711,262	$ 991,467	$ 1,118,291	$ (991,467)	$ 407,029	241	$ 1,692	$ 1,957
Industrial	1	$ 8,533	$ 3,420	$ 4,767	$ 5,376	$ (4,767)	$ 1,957	1	$ 3,384	$ 1,957
Clays:										
Kaolin	None									
Fireclay	None									
Bentonite	1	$ 74,700	$ 19,320	$ 63,000	$ 28,860	$ (11,700)	$ 9,540	1	$ 16,778	$ 9,540
Fuller's earth	4	$ 298,600	$ 77,281	$ 252,000	$ 115,441	$ (46,600)	$ 38,161	2	$ 16,778	$ 9,540
Ball Clay	1	$ 74,700	$ 19,320	$ 63,000	$ 28,860	$ (11,700)	$ 9,540	1	$ 16,778	$ 9,540
Common Clay	None									
Rock Salt/Sodium Chloride	1	$ 74,700	$ 19,320	$ 63,000	$ 28,860	$ (11,700)	$ 9,540	1	$ 16,778	$ 9,540
Gypsum	7	$ 522,900	$ 135,241	$ 441,000	$ 202,022	$ (81,900)	$ 66,781	4	$ 16,778	$ 9,540
Sodium Carbonate	1	$ 99,600	$ 25,396	$ 84,000	$ 38,119	$ (15,600)	$ 12,724	2	$ 5,135	$ 12,724
Sodium sulfate	None									
Pumice	2	$ 149,400	$ 38,640	$ 126,000	$ 57,721	$ (23,400)	$ 19,080	1	$ 16,778	$ 9,540
Gilsonite	None									
Talc and Pyrophyllite	None									
Boron	None									
Barite	6	$ 597,600	$ 154,562	$ 504,000	$ 230,883	$ (93,600)	$ 76,321	4	$ 19,141	$ 9,540
Fluorspar	1	$ 74,700	$ 19,320	$ 63,000	$ 28,860	$ (11,700)	$ 9,540	0	$ 29,233	$ 9,540
Feldspar	None									
Diatomite	None									
Perlite	None									
Vermiculite	None									
Mica	1	$ 74,700	$ 19,320	$ 63,000	$ 28,860	$ (11,700)	$ 9,540	0	$ 19,141	$ 9,540
Kyanite	None									
Total	352	$ 4,949,467	$ 1,570,676	$ 3,175,833	$ 2,428,280	$ (1,773,633)	$ 857,614	369	$ 2,327	$ 2,583
								334 Mg/yr	2565 $/Mg	

*Potential emission reduction associated with increased testing and monitoring (based on potential emissions from malfunctioning controls)

Fugitive Testing: Initial M9
Fugitive Monitoring: Monthly water flow check for water sprays
Repeat (every 5 yrs) M9 for affected facilities with carryover/other fugitive control

Stack Testing: Initial M5, Omit M9 No repeat tests
Stack (BH) Monitoring: Monthly 30-min M22

SCENARIO: **Stack variation 5**

Summary of Nationwide Testing, Monitoring, Reporting, and Recordkeeping Costs for Subpart OOO (Year 6+)

Mineral type	No. new model plants	Baseline capital cost	Baseline annualized cost	Post-revision capital cost	Post-revision annualized cost	Difference in capital cost	Difference in annualized cost	Potential emission reduction,* tpy	Potential cost effectiveness ($/ton)	Difference in annualized cost per plant
Crushed & Broken stone	96	-	14,999	249,600	443,389	$ 249,600	$ 428,394	111	$ 3,858	$ 4,462
Sand & Gravel:										
Construction	208	-	32,489	540,800	960,677	$ 540,800	$ 928,188	241	$ 3,858	$ 4,462
Industrial	1	-	156	2,600	4,619	$ 2,600	$ 4,462	1	$ 7,716	$ 4,462
Clays:										
Kaolin	None									
Pinolay	None									
Bentonite	1	-	156	-	12,562	$ -	$ 12,405	1	$ 21,817	$ 12,405
Fuller's earth	4	-	625	-	50,246	$ -	$ 49,621	2	$ 21,817	$ 12,405
Ball Clay	1	-	156	-	12,562	$ -	$ 12,405	1	$ 21,817	$ 12,405
Common Clay	None									
Rock Salt/Sodium Chloride	1	-	156	-	12,562	$ -	$ 12,405	1	$ 21,817	$ 12,405
Gypsum	7	-	1,093	-	87,931	$ -	$ 86,838	4	$ 21,817	$ 12,405
Sodium Carbonate	1	-	156	-	16,697	$ -	$ 16,540	2	$ 8,575	$ 16,540
Sodium sulfate	None									
Pumice	2	-	312	-	25,123	$ -	$ 24,811	1	$ 21,817	$ 12,405
Gilsonite	None									
Talc and Pyrophyllite	None									
Boron	None									
Barite	8	-	1,250	-	100,493	$ -	$ 99,243	4	$ 24,889	$ 12,405
Fluorspar	1	-	156	-	12,562	$ -	$ 12,405	0	$ 38,013	$ 12,405
Feldspar	None									
Diatomite	None									
Perlite	None									
Vermiculite	None									
Mica	1	-	156	-	12,562	$ -	$ 12,405	0	$ 24,889	$ 12,405
Kyanite	None									
Total	332	$ -	$ 51,856	$ 793,000	$ 1,791,983	$ 793,000	$ 1,700,125	369	$ 4,613	$ 9,121

*Potential emission reduction associated with increased testing and monitoring (based on potential emissions from malfunctioning controls)

334 Mg/yr

5084 $/Mg

Fugitive Testing: Initial M9 **Stack Testing:** Initial M5 and M9. Repeat M9 for all. Repeat M5 every 5 yrs for stacks >=2500 acfm.
Fugitive Monitoring: Monthly water flow check for water sprays **Stack (BH) Monitoring:** Semiannual 30-min M22. **SCENARIO:** Stack variation 6
Repeat (every 5 yrs) M9 for affected facilities with carryover/other fugitive control

Summary of Nationwide Testing, Monitoring, Reporting, and Recordkeeping Costs for Subpart OOO (Years 1-5)

Mineral type	No. new model plants	Baseline capital cost	Baseline annualized cost	Post-revision capital cost	Post-revision annualized cost	Difference in capital cost	Difference in annualized cost	Potential emission reduction,* tpy	Potential cost effectiveness ($/ton)	Difference in annualized cost per plant
Crushed & Broken stone	96	$ 815,200	$ 328,276	$ 457,600	$ 616,134	$ (457,600)	$ 187,860	111	$ 1,692	$ 1,957
Sand & Gravel:										
Construction	208	$ 1,962,933	$ 711,262	$ 991,467	$ 1,118,291	$ (991,467)	$ 407,029	241	$ 1,692	$ 1,957
Industrial	1	$ 9,533	$ 3,420	$ 4,767	$ 5,376	$ (4,767)	$ 1,957	1	$ 3,384	$ 1,957
Clays:										
Kaolin	None									
Fireclay	None									
Bentonite	1	$ 74,700	$ 19,320	$ 74,700	$ 34,827	$ -	$ 15,507	1	$ 27,271	$ 15,507
Fuller's earth	4	$ 298,800	$ 77,281	$ 298,800	$ 139,307	$ -	$ 62,026	2	$ 27,271	$ 15,507
Ball Clay	1	$ 74,700	$ 19,320	$ 74,700	$ 34,827	$ -	$ 15,507	1	$ 27,271	$ 15,507
Common Clay	None									
Rock Salt/Sodium Chloride	1	$ 74,700	$ 19,320	$ 74,700	$ 34,827	$ -	$ 15,507	1	$ 27,271	$ 15,507
Gypsum	7	$ 522,900	$ 135,241	$ 522,900	$ 243,767	$ -	$ 108,546	4	$ 27,271	$ 15,507
Sodium Carbonate	1	$ 99,600	$ 25,398	$ 99,600	$ 45,492	$ -	$ 20,096	2	$ 6,109	$ 20,096
Sodium sulfate	None									
Pumice	2	$ 149,400	$ 38,640	$ 149,400	$ 69,654	$ -	$ 31,013	1	$ 27,271	$ 15,507
Gilsonite	None									
Talc and Pyrophyllite	None									
Boron	None									
Barite	8	$ 597,600	$ 154,562	$ 597,600	$ 278,614	$ -	$ 124,053	4	$ 31,111	$ 15,507
Fluorspar	1	$ 74,700	$ 19,320	$ 74,700	$ 34,827	$ -	$ 15,507	0	$ 47,516	$ 15,507
Feldspar	None									
Diatomite	None									
Perlite	None									
Vermiculite	None									
Mica	1	$ 74,700	$ 19,320	$ 74,700	$ 34,827	$ -	$ 15,507	0	$ 31,111	$ 15,507
Kyanite	None									
Total	332	$ 4,949,467	$ 1,570,676	$ 3,495,633	$ 2,580,789	$ (1,453,833)	$ 1,020,113	369	$ 2,768	$ 3,073
								334 Mg/yr	3051 $/Mg	

*Potential emission reduction associated with increased testing and monitoring (based on potential emissions from malfunctioning controls)

Fugitive Testing: Initial M9
Fugitive Monitoring: Monthly water flow check for water sprays
Repeat (every 5 yrs) M9 for affected facilities with carryover/other fugitive control

Stack Testing: Initial M5 and M9. Repeat M9 for all. Repeat M5 every 5 yrs for stacks >=2500 acfm.
Stack (BH) Monitoring: Semiannual 30-min M22.

SCENARIO: Stack variation 6

Summary of Nationwide Testing, Monitoring, Reporting, and Recordkeeping Costs for Subpart OOO (Year 6+)

Mineral type	No. new model plants	Baseline capital cost	Baseline annualized cost	Post-revision capital cost	Post-revision annualized cost	Difference in capital cost	Difference in annualized cost	Potential emission reduction,* tpy	Potential cost effectiveness ($/ton)	Difference in annualized cost per plant
Crushed & Broken stone	96	-	14,999	249,600	443,389	$ 249,600	$ 428,394	111	$ 3,856	$ 4,462
Sand & Gravel:										
Construction	208	-	32,489	540,800	960,677	$ 540,800	$ 928,188	241	$ 3,856	$ 4,462
Industrial	1	-	156	2,600	4,619	$ 2,600	$ 4,462	1	$ 7,716	$ 4,462
Clays:										
Kaolin	None									
Fireclay	None									
Bentonite	1	-	156	14,000	19,089	$ 14,000	$ 18,933	1	$ 33,296	$ 18,933
Fuller's earth	4	-	625	56,000	76,357	$ 56,000	$ 75,732	2	$ 33,296	$ 18,933
Ball Clay	1	-	156	14,000	19,089	$ 14,000	$ 18,933	1	$ 33,296	$ 18,933
Common Clay	None									
Rock Salt/Sodium Chloride	1	-	156	14,000	19,089	$ 14,000	$ 18,933	1	$ 33,296	$ 18,933
Gypsum	7	-	1,093	98,000	133,624	$ 98,000	$ 132,531	4	$ 33,296	$ 18,933
Sodium Carbonate	1	-	156	84,000	40,758	$ 84,000	$ 40,602	2	$ 16,385	$ 40,602
Sodium sulfate	None									
Pumice	2	-	312	28,000	38,178	$ 28,000	$ 37,866	1	$ 33,296	$ 18,933
Gilsonite	None									
Talc and Pyrophyllite	None									
Boron	None									
Barite	8	-	1,250	112,000	152,714	$ 112,000	$ 151,464	4	$ 37,986	$ 18,933
Fluorspar	1	-	156	14,000	19,089	$ 14,000	$ 18,933	0	$ 58,015	$ 18,933
Feldspar	None									
Diatomite	None									
Perlite	None									
Vermiculite	None									
Mica	1	-	156	14,000	19,089	$ 14,000	$ 18,933	0	$ 37,986	$ 18,933
Kyanite	None									
Total	332	$ -	$ 51,858	$ 1,241,000	$ 1,945,763	$ 1,241,000	$ 1,893,905	369	$ 5,136	$ 5,705
								334 Mg/yr	5664 $/Mg	

*Potential emission reduction associated with increased testing and monitoring (based on potential emissions from malfunctioning controls)

Fugitive Testing: Initial M9
Fugitive Monitoring: Monthly water flow check for water sprays
Annual M9 for all affected facilities

Stack Testing: Initial M5. Omit M9.
Stack (BH) Monitoring: Quarterly 30-min M22.

SCENARIO: Fugitive variation A

Summary of Nationwide Testing, Monitoring, Reporting, and Recordkeeping Costs for Subpart OOO (Years 1-5)

Mineral type	No. new model plants	Baseline capital cost	Baseline annualized cost	Post-revision capital cost	Post-revision annualized cost	Difference in capital cost	Difference in annualized cost	Potential emission reduction,* tpy	Potential cost effectiveness ($/ton)	Difference in annualized cost per plant
Crushed & Broken stone	96	$ 915,200	$ 328,275	$ 457,600	$ 1,141,680	$ (457,600)	$ 813,405	111	$ 7,325	$ 8,473
Sand & Gravel:										
Construction	208	$ 1,982,933	$ 711,262	$ 991,467	$ 2,473,639	$ (991,467)	$ 1,762,377	241	$ 7,325	$ 8,473
Industrial	1	$ 9,533	$ 3,420	$ 4,767	$ 11,892	$ (4,767)	$ 8,473	1	$ 14,651	$ 8,473
Clays:										
Kaolin	None									
Fireclay	None									
Bentonite	1	$ 74,700	$ 19,320	$ 63,000	$ 20,590	$ (11,700)	$ 1,270	1	$ 2,233	$ 1,270
Fuller's earth	4	$ 298,800	$ 77,281	$ 252,000	$ 82,360	$ (46,800)	$ 5,080	2	$ 2,233	$ 1,270
Ball Clay	1	$ 74,700	$ 19,320	$ 63,000	$ 20,590	$ (11,700)	$ 1,270	1	$ 2,233	$ 1,270
Common Clay	None									
Rock Salt/Sodium Chloride	1	$ 74,700	$ 19,320	$ 63,000	$ 20,590	$ (11,700)	$ 1,270	1	$ 2,233	$ 1,270
Gypsum	7	$ 522,900	$ 135,241	$ 441,000	$ 144,131	$ (81,900)	$ 8,889	4	$ 2,233	$ 1,270
Sodium Carbonate	1	$ 99,600	$ 25,396	$ 84,000	$ 27,092	$ (15,600)	$ 1,697	2	$ 685	$ 1,697
Sodium sulfate	None									
Pumice	2	$ 149,400	$ 38,640	$ 126,000	$ 41,180	$ (23,400)	$ 2,540	1	$ 2,233	$ 1,270
Gilsonite	None									
Talc and Pyrophyllite	None									
Boron	None									
Barite	8	$ 597,600	$ 154,562	$ 504,000	$ 164,721	$ (93,600)	$ 10,159	4	$ 2,548	$ 1,270
Fluorspar	1	$ 74,700	$ 19,320	$ 63,000	$ 20,590	$ (11,700)	$ 1,270	0	$ 3,891	$ 1,270
Feldspar	None									
Diatomite	None									
Perlite	None									
Vermiculite	None									
Mica	1	$ 74,700	$ 19,320	$ 63,000	$ 20,590	$ (11,700)	$ 1,270	0	$ 2,548	$ 1,270
Kyanite	None									
Total	332	$ 4,949,467	$ 1,570,676	$ 3,175,833	$ 4,189,646	$ (1,773,633)	$ 2,618,970	369	$ 7,105	$ 7,888
								334 Mg/yr	7832 $/Mg	

*Potential emission reduction associated with increased testing and monitoring (based on potential emissions from malfunctioning controls)

Fugitive Testing: Initial M9
Fugitive Monitoring: Monthly water flow check for water sprays
Annual M9 for all affected facilities

Stack Testing: Initial M5, Omit M9.
Stack (BH) Monitoring: Quarterly 30-min M22.

SCENARIO: **Fugitive variation A**

Summary of Nationwide Testing, Monitoring, Reporting, and Recordkeeping Costs for Subpart OOO (Year 6+)

Mineral type	No. new model plants	Baseline capital cost	Baseline annualized cost	Post-revision capital cost	Post-revision annualized cost	Difference in capital cost	Difference in annualized cost	Potential emission reduction,* tpy	Potential cost effectivness ($/ton)	Difference in annualized cost per plant
Crushed & Broken stone	96	-	14,595	-	941,054	$ -	$ 926,059	111	$ 8,340	$ 9,646
Sand & Gravel:										
Construction	208	-	32,469	-	2,038,951	$ -	$ 2,009,461	241	$ 8,340	$ 9,646
Industriel	1	-	156	-	9,803	$ -	$ 9,646	1	$ 16,680	$ 9,646
Clays:										
Kaolin	None									
Fireclay	None									
Bentonite	1	-	156	-	4,291	$ -	$ 4,135	1	$ 7,272	$ 4,135
Fuller's earth	4	-	625	-	17,165	$ -	$ 16,540	2	$ 7,272	$ 4,135
Ball Clay	1	-	156	-	4,291	$ -	$ 4,135	1	$ 7,272	$ 4,135
Common Clay	None									
Rock Salt/Sodium Chloride	1	-	156	-	4,291	$ -	$ 4,135	1	$ 7,272	$ 4,135
Gypsum	7	-	1,093	-	30,039	$ -	$ 28,946	4	$ 7,272	$ 4,135
Sodium Carbonate	1	-	156	-	5,670	$ -	$ 5,513	2	$ 2,225	$ 5,513
Sodium sulfate	None									
Pumice	2	-	312	-	8,583	$ -	$ 8,270	1	$ 7,272	$ 4,135
Gilsonite	None									
Talc and Pyrophyllite	None									
Boron	None									
Barite	8	-	1,250	-	34,331	$ -	$ 33,081	4	$ 8,296	$ 4,135
Fluorspar	1	-	156	-	4,291	$ -	$ 4,135	0	$ 12,671	$ 4,135
Feldspar	None									
Diatomite	None									
Perlite	None									
Vermiculite	None									
Mica	1	-	156	-	4,291	$ -	$ 4,135	0	$ 8,296	$ 4,135
Kyanite	None									
Total	332	$ -	$ 51,858	$ -	$ 3,107,052	$ -	$ 3,055,193	369	$ 8,289	$ 9,202

*Potential emission reduction associated with increased testing and monitoring (based on potential emissions from malfunctioning controls)

334 Mg/yr

9137 $/Mg

Fugitive Testing: Initial M9
Fugitive Monitoring: Daily water flow check for water sprays
M9 every 5 years for all affected facilities

Stack Testing: Initial M5, Omit M9.
Stack (BH) Monitoring: Quarterly 30-min M22.

SCENARIO: Fugitive variation B

Summary of Nationwide Testing, Monitoring, Reporting, and Recordkeeping Costs for Subpart OOO (Years 1-5)

Mineral type	No. new model plants	Baseline capital cost	Baseline annualized cost	Post-revision capital cost	Post-revision annualized cost	Difference in capital cost	Difference in annualized cost	Potential emission reduction,* tpy	Potential cost effectiveness ($/ton)	Difference in annualized cost per plant
Crushed & Broken stone	96	$ 915,200	$ 528,275	$ 457,600	$ 6,476,325	$ (457,600)	$ 6,148,051	121	$ 50,958	$ 64,042
Sand & Gravel:										
Construction	208	$ 1,982,933	$ 711,262	$ 991,467	$ 14,032,038	$ (991,467)	$ 13,320,777	261	$ 50,958	$ 64,042
Industrial	1	$ 9,533	$ 3,420	$ 4,767	$ 67,462	$ (4,767)	$ 64,042	1	$ 101,917	$ 64,042
Clays:										
Kaolin	None									
Fireclay	None									
Bentonite	1	$ 74,700	$ 19,320	$ 63,000	$ 20,590	$ (11,700)	$ 1,270	1	$ 2,233	$ 1,270
Fuller's earth	4	$ 298,800	$ 77,281	$ 252,000	$ 82,360	$ (46,800)	$ 5,080	2	$ 2,233	$ 1,270
Ball Clay	1	$ 74,700	$ 19,320	$ 63,000	$ 20,590	$ (11,700)	$ 1,270	1	$ 2,233	$ 1,270
Common Clay	None									
Rock Salt/Sodium Chloride	1	$ 74,700	$ 19,320	$ 63,000	$ 20,590	$ (11,700)	$ 1,270	1	$ 2,233	$ 1,270
Gypsum	7	$ 522,900	$ 135,241	$ 441,000	$ 144,131	$ (81,900)	$ 8,889	4	$ 2,233	$ 1,270
Sodium Carbonate	1	$ 99,600	$ 25,395	$ 84,000	$ 27,382	$ (15,600)	$ 1,697	2	$ 685	$ 1,697
Sodium sulfate	None									
Pumice	2	$ 149,400	$ 38,640	$ 126,000	$ 41,180	$ (23,400)	$ 2,540	1	$ 2,233	$ 1,270
Gilsonite	None									
Talc and Pyrophyllite	None									
Boron	None									
Barite	8	$ 597,600	$ 154,562	$ 504,000	$ 164,721	$ (93,600)	$ 10,159	4	$ 2,548	$ 1,270
Fluorspar	1	$ 74,700	$ 19,320	$ 63,000	$ 20,590	$ (11,700)	$ 1,270	0	$ 3,891	$ 1,270
Feldspar	None									
Diatomite	None									
Perlite	None									
Vermiculite	None									
Mica	1	$ 74,700	$ 19,320	$ 63,000	$ 20,590	$ (11,700)	$ 1,270	0	$ 2,548	$ 1,270
Kyanite	None									
Total	332	$ 4,849,467	$ 1,570,676	$ 3,175,833	$ 21,136,260	$ (1,773,633)	$ 19,567,584	399	$ 49,033	$ 58,939

*Potential emission reduction associated with increased testing and monitoring (based on potential emissions from malfunctioning controls)

362 Mg/yr

54050 $/Mg

Fugitive Testing: Initial M9
Fugitive Monitoring: Daily water flow check for water sprays
M9 every 5 years for all affected facilities

Stack Testing: Initial M5. Omit M9.
Stack (BH) Monitoring: Quarterly 30-min M22.

SCENARIO: **Fugitive variation B**

Summary of Nationwide Testing, Monitoring, Reporting, and Recordkeeping Costs for Subpart OOO (Year 6+)

Mineral type	No. new model plants	Baseline capital cost	Baseline annualized cost	Post-revision capital cost	Post-revision annualized cost	Difference in capital cost	Difference in annualized cost	Potential emission reduction,* tpy	Potential cost effectiveness ($/ton)	Difference in annualized cost per plant
Crushed & Broken stone	96	-	14,995	457,600	6,454,332	$ 457,600	$ 6,439,337	121	$ 53,373	$ 67,076
Sand & Gravel:										
Construction	208	-	32,486	991,467	13,984,387	$ 991,467	$ 13,951,896	261	$ 53,373	$ 67,076
Industrial	1	-	156	4,767	67,233	$ 4,767	$ 67,076	1	$ 106,746	$ 67,076
Clays:										
Kaolin	None									
Fireclay	None									
Bentonite	1	-	156	-	4,291	$ -	$ 4,135	1	$ 7,272	$ 4,135
Fuller's earth	4	-	625	-	17,165	$ -	$ 16,540	2	$ 7,272	$ 4,135
Ball Clay	1	-	156	-	4,291	$ -	$ 4,135	1	$ 7,272	$ 4,135
Common Clay	None									
Rock Salt/Sodium Chloride	1	-	156	-	4,291	$ -	$ 4,135	1	$ 7,272	$ 4,135
Gypsum	7	-	1,093	-	30,039	$ -	$ 28,946	4	$ 7,272	$ 4,135
Sodium Carbonate	1	-	156	-	5,670	$ -	$ 5,513	2	$ 2,225	$ 5,513
Sodium sulfate	None									
Pumice	2	-	312	-	8,583	$ -	$ 8,270	1	$ 7,272	$ 4,135
Gilsonite	None									
Talc and Pyrophyllite	None									
Boron	None									
Barite	8	-	1,250	-	34,331	$ -	$ 33,081	4	$ 8,296	$ 4,135
Fluorspar	1	-	156	-	4,291	$ -	$ 4,135	0	$ 12,671	$ 4,135
Feldspar	None									
Diatomite	None									
Perlite	None									
Vermiculite	None									
Mica	1	-	156	-	4,291	$ -	$ 4,135	0	$ 8,296	$ 4,135
Kyanite	None									
Total	332	$ -	$ 51,856	$ 1,453,833	$ 20,623,196	$ 1,453,833	$ 20,571,338	399	$ 51,548	$ 51,962

*Potential emission reduction associated with increased testing and monitoring (based on potential emissions from malfunctioning controls)

362 Mg/yr

56822 $/Mg

Fugitive Testing: Initial M9
Fugitive Monitoring: Weekly water flow check for water sprays
M9 every 5 years for all affected facilities

Stack Testing: Initial M5. Omit M9
Stack (BH) Monitoring: Quarterly 30-min M22.

SCENARIO: **Fugitive variation C**

Summary of Nationwide Testing, Monitoring, Reporting, and Recordkeeping Costs for Subpart OOO (Years 1-5)

Mineral type	No. new model plants	Baseline capital cost	Baseline annualized cost	Post-revision capital cost	Post-revision annualized cost	Difference in capital cost	Difference in annualized cost	Potential emission reduction,* tpy	Potential cost effectiveness ($/ton)	Difference in annualized cost per plant
Crushed & Broken stone	96	$ 915,200	$ 328,275	$ 457,600	$ 1,467,761	$ (457,600)	$ 1,139,487	119	$ 9,589	$ 11,870
Sand & Gravel:										
Construction	208	$ 1,982,933	$ 711,262	$ 991,467	$ 3,180,150	$ (991,467)	$ 2,468,888	257	$ 9,599	$ 11,870
Industrial	1	$ 9,533	$ 3,420	$ 4,767	$ 19,289	$ (4,767)	$ 11,870	1	$ 19,196	$ 11,870
Clays:										
Kaolin	None									
Fireclay	None									
Bentonite	1	$ 74,700	$ 19,320	$ 63,000	$ 20,590	$ (11,700)	$ 1,270	1	$ 2,233	$ 1,270
Fuller's earth	4	$ 298,800	$ 77,281	$ 252,000	$ 82,360	$ (46,800)	$ 5,080	2	$ 2,233	$ 1,270
Ball Clay	1	$ 74,700	$ 19,320	$ 63,000	$ 20,590	$ (11,700)	$ 1,270	1	$ 2,233	$ 1,270
Common Clay	None									
Rock Salt/Sodium Chloride	1	$ 74,700	$ 19,320	$ 63,000	$ 20,590	$ (11,700)	$ 1,270	1	$ 2,233	$ 1,270
Gypsum	7	$ 522,900	$ 135,241	$ 441,000	$ 144,131	$ (81,900)	$ 8,889	4	$ 2,233	$ 1,270
Sodium Carbonate	1	$ 99,600	$ 25,396	$ 84,000	$ 27,092	$ (15,600)	$ 1,697	2	$ 885	$ 1,697
Sodium sulfate	None									
Pumice	2	$ 149,400	$ 38,640	$ 126,000	$ 41,180	$ (23,400)	$ 2,540	1	$ 2,233	$ 1,270
Gilsonite	None									
Talc and Pyrophyllite	None									
Boron	None									
Barite	8	$ 597,600	$ 154,562	$ 504,000	$ 164,721	$ (93,600)	$ 10,159	4	$ 2,548	$ 1,270
Fluorspar	1	$ 74,700	$ 19,320	$ 63,000	$ 20,590	$ (11,700)	$ 1,270	0	$ 3,891	$ 1,270
Feldspar	None									
Diatomite	None									
Perlite	None									
Vermiculite	None									
Mica	1	$ 74,700	$ 19,320	$ 63,000	$ 20,590	$ (11,700)	$ 1,270	0	$ 2,548	$ 1,270
Kyanite	None									
Total	332	$ 4,949,467	$ 1,570,676	$ 3,175,833	$ 5,225,636	$ (1,773,633)	$ 3,654,959	393	$ 9,302	$ 11,009
								356 Mg/yr	10254 $/Mg	

*Potential emission reduction associated with increased testing and monitoring (based on potential emissions from malfunctioning controls)

Fugitive Testing: Initial M9
Fugitive Monitoring: Weekly water flow check for water sprays
M9 every 5 years for all affected facilities

Stack Testing: Initial M5, Omit M9.
Stack (BH) Monitoring: Quarterly 30-min M22.

SCENARIO: **Fugitive variation C**

Summary of Nationwide Testing, Monitoring, Reporting, and Recordkeeping Costs for Subpart OOO (Year 6+)

Mineral type	No. new model plants	Baseline capital cost	Baseline annualized cost	Post-revision capital cost	Post-revision annualized cost	Difference in capital cost	Difference in annualized cost	Potential emission reduction,* tpy	Potential cost effectiveness ($/ton)	Difference in annualized cost per plant
Crushed & Broken stone	96	-	14,996	457,600	1,446,769	$ 457,600	$ 1,430,774	119	$ 12,053	$ 14,904
Sand & Gravel:										
Construction	208	-	32,489	991,467	3,132,489	$ 991,467	$ 3,100,009	257	$ 12,053	$ 14,904
Industrial	1	-	156	4,767	15,060	$ 4,767	$ 14,904	1	$ 24,105	$ 14,904
Clays:										
Kaolin	None									
Fireclay	None									
Bentonite	1	-	156	-	4,291	$ -	$ 4,135	1	$ 7,272	$ 4,135
Fuller's earth	4	-	625	-	17,165	$ -	$ 16,540	2	$ 7,272	$ 4,135
Ball Clay	1	-	156	-	4,291	$ -	$ 4,135	1	$ 7,272	$ 4,135
Common Clay	None									
Rock Salt/Sodium Chloride	1	-	156	-	4,291	$ -	$ 4,135	1	$ 7,272	$ 4,135
Gypsum	7	-	1,093	-	30,039	$ -	$ 28,946	4	$ 7,272	$ 4,135
Sodium Carbonate	1	-	156	-	5,670	$ -	$ 5,513	2	$ 2,225	$ 5,513
Sodium sulfate	None									
Pumice	2	-	312	-	8,583	$ -	$ 8,270	1	$ 7,272	$ 4,135
Gilsonite	None									
Talc and Pyrophyllite	None									
Boron	None									
Barite	8	-	1,250	-	34,331	$ -	$ 33,081	4	$ 8,296	$ 4,135
Fluorspar	1	-	156	-	4,291	$ -	$ 4,135	0	$ 12,671	$ 4,135
Feldspar	None									
Diatomite	None									
Perlite	None									
Vermiculite	None									
Mica	1	-	156	-	4,291	$ -	$ 4,135	0	$ 8,296	$ 4,135
Kyanite	None									
Total	332	$ -	$ 51,859	$ 1,453,833	$ 4,710,571	$ 1,453,833	$ 4,658,713	393	$ 11,857	$ 14,032

*Potential emission reduction associated with increased testing and monitoring (based on potential emissions from malfunctioning controls)

356 Mg/yr

13070 $/Mg

Fugitive Testing: Initial M9
Fugitive Monitoring: Monthly water flow check for water sprays
M9 every 5 years for all affected facilities

Stack Testing: Initial M5, Omit M9.
Stack (BH) Monitoring: Quarterly 30-min M22.

SCENARIO: **Fugitive variation D**

Summary of Nationwide Testing, Monitoring, Reporting, and Recordkeeping Costs for Subpart OOO (Years 1-5)

Mineral type	No. new model plants	Baseline capital cost	Baseline annualized cost	Post-revision capital cost	Post-revision annualized cost	Difference in capital cost	Difference in annualized cost	Potential emission reduction,* tpy	Potential cost effectiveness ($/ton)	Difference in annualized cost per plant
Crushed & Broken stone	96	$ 915,200	$ 328,275	$ 457,600	$ 516,134	$ (457,600)	$ 187,860	111	$ 1,692	$ 1,957
Sand & Gravel:										
Construction	208	$ 1,982,933	$ 711,282	$ 991,467	$ 1,118,291	$ (991,467)	$ 407,029	241	$ 1,692	$ 1,957
Industrial	1	$ 9,533	$ 3,420	$ 4,767	$ 5,376	$ (4,767)	$ 1,957	1	$ 3,384	$ 1,957
Clays:										
Kaolin	None									
Fireclay	None									
Bentonite	1	$ 74,700	$ 19,320	$ 63,000	$ 20,590	$ (11,700)	$ 1,270	1	$ 2,233	$ 1,270
Fuller's earth	4	$ 298,800	$ 77,281	$ 252,000	$ 82,360	$ (46,800)	$ 5,080	2	$ 2,233	$ 1,270
Ball Clay	1	$ 74,700	$ 19,320	$ 63,000	$ 20,590	$ (11,700)	$ 1,270	1	$ 2,233	$ 1,270
Common Clay	None									
Rock Salt/Sodium Chloride	1	$ 74,700	$ 19,320	$ 63,000	$ 20,590	$ (11,700)	$ 1,270	1	$ 2,233	$ 1,270
Gypsum	7	$ 522,900	$ 135,241	$ 441,000	$ 144,131	$ (81,900)	$ 8,889	4	$ 2,233	$ 1,270
Sodium Carbonate	1	$ 92,600	$ 25,396	$ 84,000	$ 27,092	$ (15,600)	$ 1,697	2	$ 886	$ 1,697
Sodium sulfate	None									
Pumice	2	$ 149,400	$ 38,640	$ 126,000	$ 41,180	$ (23,400)	$ 2,540	1	$ 2,233	$ 1,270
Gilsonite	None									
Talc and Pyrophyllite	None									
Boron	None									
Barite	8	$ 597,600	$ 154,562	$ 504,000	$ 164,721	$ (93,600)	$ 10,159	4	$ 2,548	$ 1,270
Fluorspar	1	$ 74,700	$ 19,320	$ 63,000	$ 20,590	$ (11,700)	$ 1,270	0	$ 3,891	$ 1,270
Feldspar	None									
Diatomite	None									
Perlite	None									
Vermiculite	None									
Mica	1	$ 74,700	$ 19,320	$ 63,000	$ 20,590	$ (11,700)	$ 1,270	0	$ 2,548	$ 1,270
Kyanite	None									
Total	332	$ 4,949,467	$ 1,570,676	$ 3,175,833	$ 2,202,237	$ (1,773,633)	$ 631,560	369	$ 1,713	$ 1,902
								334 Mg/yr	1889 $/Mg	

*Potential emission reduction associated with increased testing and monitoring (based on potential emissions from malfunctioning control(s)

Fugitive Testing: Initial M9
Fugitive Monitoring: Monthly water flow check for water sprays
M9 every 5 years for all affected facilities

Stack Testing: Initial M5, Omit M9
Stack (BH) Monitoring: Quarterly 30-min M22.

SCENARIO: **Fugitive variation D**

Summary of Nationwide Testing, Monitoring, Reporting, and Recordkeeping Costs for Subpart OOO (Year 6+)

Mineral type	No. new model plants	Baseline capital cost	Baseline annualized cost	Post-revision capital cost	Post-revision annualized cost	Difference in capital cost	Difference in annualized cost	Potential emission reduction,* tpy	Potential cost effectiveness ($/ton)	Difference in annualized cost per plant
Crushed & Broken stone	96	-	14,995	457,600	494,141	$ 457,600	$ 479,146	111	$ 4,315	$ 4,991
Sand & Gravel:										
Construction	208	-	32,489	991,467	1,070,640	$ 991,467	$ 1,038,150	241	$ 4,315	$ 4,991
Industrial	1	-	156	4,767	5,147	$ 4,767	$ 4,991	1	$ 8,630	$ 4,991
Clays:										
Kaolin	None									
Fireclay	None									
Bentonite	1	-	156	-	4,291	$ -	$ 4,135	1	$ 7,272	$ 4,135
Fuller's earth	4	-	625	-	17,165	$ -	$ 16,540	2	$ 7,272	$ 4,135
Ball Clay	1	-	156	-	4,291	$ -	$ 4,135	1	$ 7,272	$ 4,135
Common Clay	None									
Rock Salt/Sodium Chloride	1	-	156	-	4,291	$ -	$ 4,135	1	$ 7,272	$ 4,135
Gypsum	7	-	1,093	-	30,039	$ -	$ 28,946	4	$ 7,272	$ 4,135
Sodium Carbonate	1	-	156	-	5,670	$ -	$ 5,513	2	$ 2,225	$ 5,513
Sodium sulfate	None									
Pumice	2	-	312	-	8,583	$ -	$ 8,270	1	$ 7,272	$ 4,135
Gilsonite	None									
Talc and Pyrophyllite	None									
Boron	None									
Barite	6	-	1,250	-	34,331	$ -	$ 33,081	4	$ 8,296	$ 4,135
Fluorspar	1	-	156	-	4,291	$ -	$ 4,135	0	$ 12,671	$ 4,135
Feldspar	None									
Diatomite	None									
Perlite	None									
Vermiculite	None									
Mica	1	-	156	-	4,291	$ -	$ 4,135	0	$ 8,296	$ 4,135
Kyanite	None									
Total	332	$ -	$ 51,858	$ 1,453,833	$ 1,687,173	$ 1,453,833	$ 1,635,315	369	$ 4,437	$ 4,926
								334 Mg/yr	4891 $/Mg	

*Potential emission reduction associated with increased testing and monitoring (based on potential emissions from malfunctioning controls)

Fugitive Testing: Initial M9
Fugitive Monitoring: Monthly water flow check for water sprays
Annual M9 for affected facilities with carryover/other fugitive control

Stack Testing: Initial M5, Omit M9.
Stack (BH) Monitoring: Quarterly 30-min M22

SCENARIO: **Fugitive variation E**

Summary of Nationwide Testing, Monitoring, Reporting, and Recordkeeping Costs for Subpart COO (Years 1-5)

Mineral type	No. new model plants	Baseline capital cost	Baseline annualized cost	Post-revision capital cost	Post-revision annualized cost	Difference in capital cost	Difference in annualized cost	Potential emission reduction,* tpy	Potential cost effectiveness ($/ton)	Difference in annualized cost per plant
Crushed & Broken stone	96	$ 915,200	$ 328,275	$ 457,600	$ 933,680	$ (457,600)	$ 605,405	111	$ 5,452	$ 6,306
Sand & Gravel:										
Construction	208	$ 1,982,933	$ 711,262	$ 991,467	$ 2,022,972	$ (991,467)	$ 1,311,711	241	$ 5,452	$ 6,306
Industrial	1	$ 9,533	$ 3,420	$ 4,767	$ 9,726	$ (4,767)	$ 6,306	1	$ 10,904	$ 6,306
Clays:										
Kaolin	None									
Fireclay	None									
Bentonite	1	$ 74,700	$ 19,320	$ 63,000	$ 20,590	$ (11,700)	$ 1,270	1	$ 2,233	$ 1,270
Fuller's earth	4	$ 298,800	$ 77,281	$ 252,000	$ 82,360	$ (46,800)	$ 5,080	2	$ 2,233	$ 1,270
Ball Clay	1	$ 74,700	$ 19,320	$ 63,000	$ 20,590	$ (11,700)	$ 1,270	1	$ 2,233	$ 1,270
Common Clay	None									
Rock Salt/Sodium Chloride	1	$ 74,700	$ 19,320	$ 63,000	$ 20,590	$ (11,700)	$ 1,270	1	$ 2,233	$ 1,270
Gypsum	7	$ 522,900	$ 135,241	$ 441,000	$ 144,131	$ (81,900)	$ 8,889	4	$ 2,233	$ 1,270
Sodium Carbonate	1	$ 99,600	$ 25,396	$ 84,000	$ 27,092	$ (15,600)	$ 1,697	2	$ 885	$ 1,697
Sodium sulfate	None									
Pumice	2	$ 149,400	$ 38,640	$ 126,000	$ 41,180	$ (23,400)	$ 2,540	1	$ 2,233	$ 1,270
Gilsonite	None									
Talc and Pyrophyllite	None									
Boron	None									
Barite	8	$ 597,600	$ 154,562	$ 504,000	$ 164,721	$ (93,600)	$ 10,159	4	$ 2,548	$ 1,270
Fluorspar	1	$ 74,700	$ 19,320	$ 63,000	$ 20,590	$ (11,700)	$ 1,270	0	$ 3,891	$ 1,270
Feldspar	None									
Diatomite	None									
Perlite	None									
Vermiculite	None									
Mica	1	$ 74,700	$ 19,320	$ 63,000	$ 20,590	$ (11,700)	$ 1,270	0	$ 2,548	$ 1,270
Kyanite	None									
Total	332	$ 4,949,467	$ 1,570,676	$ 3,175,833	$ 3,528,813	$ (1,773,633)	$ 1,958,136	369	$ 5,313	$ 5,898
								334 Mg/yr	5856 $/Mg	

*Potential emission reduction associated with increased testing and monitoring (based on potential emissions from malfunctioning controls)

Fugitive Testing: Initial M9
Fugitive Monitoring: Monthly water flow check for water sprays
Annual M9 for affected facilities with carryover/other fugitive control

Stack Testing: Initial M5, Omit M9.
Stack (BH) Monitoring: Quarterly 30-min M22.

SCENARIO: **Fugitive variation E**

Summary of Nationwide Testing, Monitoring, Reporting, and Recordkeeping Costs for Subpart OOO (Year 8+)

Mineral type	No. new model plants	Baseline capital cost	Baseline annualized cost	Post-revision capital cost	Post-revision annualized cost	Difference in capital cost	Difference in annualized cost	Potential emission reduction,* tpy	Potential cost effectiveness ($/ton)	Difference in annualized cost per plant
Crushed & Broken stone	96	-	14,995	-	733,054	$ -	$ 718,059	111	$ 6,467	$ 7,480
Sand & Gravel:										
Construction	208	-	32,469	-	1,588,284	$ -	$ 1,555,795	241	$ 6,467	$ 7,480
Industrial	1	-	156	-	7,636	$ -	$ 7,480	1	$ 12,934	$ 7,480
Clays:										
Kaolin	None									
Fireclay	None									
Bentonite	1	-	156	-	4,291	$ -	$ 4,135	1	$ 7,272	$ 4,135
Fuller's earth	4	-	625	-	17,165	$ -	$ 16,540	2	$ 7,272	$ 4,135
Ball Clay	1	-	156	-	4,291	$ -	$ 4,135	1	$ 7,272	$ 4,135
Common Clay	None									
Rock Salt/Sodium Chloride	1	-	156	-	4,291	$ -	$ 4,135	1	$ 7,272	$ 4,135
Gypsum	7	-	1,093	-	30,039	$ -	$ 28,946	4	$ 7,272	$ 4,135
Sodium Carbonate	1	-	156	-	5,670	$ -	$ 5,513	2	$ 2,225	$ 5,513
Sodium sulfate	None									
Pumice	2	-	312	-	8,583	$ -	$ 8,270	1	$ 7,272	$ 4,135
Gilsonite	None									
Talc and Pyrophyllite	None									
Boron	None									
Barite	8	-	1,250	-	34,331	$ -	$ 33,081	4	$ 8,296	$ 4,135
Fluorspar	1	-	156	-	4,291	$ -	$ 4,135	0	$ 12,671	$ 4,135
Feldspar	None									
Diatomite	None									
Perlite	None									
Vermiculite	None									
Mica	1	-	156	-	4,291	$ -	$ 4,135	0	$ 8,296	$ 4,135
Kyanite	None									
Total	332	$ -	$ 51,856	$ -	$ 2,445,218	$ -	$ 2,394,360	369	$ 6,496	$ 7,212

*Potential emission reduction associated with increased testing and monitoring (based on potential emissions from malfunctioning controls)

334 Mg/yr

7161 $/Mg

Fugitive Testing: Initial M9
Fugitive Monitoring: Monthly water flow check for water sprays
No repeat tests

Stack Testing: Initial M5. Omit M9.
Stack (BH) Monitoring: Quarterly 30-min M22.

SCENARIO: Fugitive variation G

Summary of Nationwide Testing, Monitoring, Reporting, and Recordkeeping Costs for Subpart OOO (Years 1-5)

Mineral type	No. new model plants	Baseline capital cost	Baseline annualized cost	Post-revision capital cost	Post-revision annualized cost	Difference in capital cost	Difference in annualized cost	Potential emission reduction,* tpy	Potential cost effectiveness ($/ton)	Difference in annualized cost per plant
Crushed & Broken stone	96	$ 915,200	$ 326,275	$ 457,600	$ 516,134	$ (457,600)	$ 187,860	111	$ 1,692	$ 1,957
Sand & Gravel:										
Construction	206	$ 1,982,933	$ 711,282	$ 991,467	$ 1,118,291	$ (991,467)	$ 407,029	241	$ 1,692	$ 1,957
Industrial	1	$ 9,533	$ 3,420	$ 4,767	$ 5,376	$ (4,767)	$ 1,957	1	$ 3,384	$ 1,957
Clays:										
Kaolin	None									
Fireclay	None									
Bentonite	1	$ 74,700	$ 19,320	$ 63,000	$ 20,590	$ (11,700)	$ 1,270	1	$ 2,233	$ 1,270
Fuller's earth	4	$ 298,800	$ 77,281	$ 252,000	$ 82,360	$ (46,800)	$ 5,080	2	$ 2,233	$ 1,270
Ball Clay	1	$ 74,700	$ 19,320	$ 63,000	$ 20,590	$ (11,700)	$ 1,270	1	$ 2,233	$ 1,270
Common Clay	None									
Rock Salt/Sodium Chloride	1	$ 74,700	$ 19,320	$ 63,000	$ 20,590	$ (11,700)	$ 1,270	1	$ 2,233	$ 1,270
Gypsum	7	$ 522,900	$ 135,241	$ 441,000	$ 144,131	$ (81,900)	$ 8,889	4	$ 2,233	$ 1,270
Sodium Carbonate	1	$ 99,600	$ 25,396	$ 84,000	$ 27,092	$ (15,600)	$ 1,697	2	$ 688	$ 1,697
Sodium sulfate	None									
Pumice	2	$ 149,400	$ 38,640	$ 126,000	$ 41,180	$ (23,400)	$ 2,540	1	$ 2,233	$ 1,270
Gilsonite	None									
Talc and Pyrophyllite	None									
Boron	None									
Barite	8	$ 597,600	$ 154,562	$ 504,000	$ 164,721	$ (93,600)	$ 10,159	4	$ 2,548	$ 1,270
Fluorspar	1	$ 74,700	$ 19,320	$ 63,000	$ 20,590	$ (11,700)	$ 1,270	0	$ 3,891	$ 1,270
Feldspar	None									
Diatomite	None									
Perlite	None									
Vermiculite	None									
Mica	1	$ 74,700	$ 19,320	$ 63,000	$ 20,590	$ (11,700)	$ 1,270	0	$ 2,548	$ 1,270
Kyanite	None									
Total	332	$ 4,949,467	$ 1,570,676	$ 3,175,833	$ 2,202,237	$ (1,773,633)	$ 631,560	369	$ 1,713	$ 1,902
								334 Mg/yr	1889 $/Mg	

*Potential emission reduction associated with increased testing and monitoring (based on potential emissions from malfunctioning controls)

Fugitive Testing: Initial M9
Fugitive Monitoring: Monthly water flow check for water sprays
No repeat tests

Stack Testing: Initial M5, Omit M9.
Stack (BH) Monitoring: Quarterly 30-min M22.

SCENARIO: **Fugitive variation G**

Summary of Nationwide Testing, Monitoring, Reporting, and Recordkeeping Costs for Subpart OOO (Year 5+)

Mineral type	No. new model plants	Baseline capital cost	Baseline annualized cost	Post-revision capital cost	Post-revision annualized cost	Difference in capital cost	Difference in annualized cost	Potential emission reduction,* tpy	Potential cost effectiveness ($/ton)	Difference in annualized cost per plant
Crushed & Broken stone	96	-	14,995	-	315,509	$ -	$ 300,514	111	$ 2,706	$ 3,130
Sand & Gravel:										
Construction	208	-	32,488	-	683,603	$ -	$ 651,113	241	$ 2,706	$ 3,130
Industrial	1	-	156	-	3,287	$ -	$ 3,130	1	$ 5,413	$ 3,130
Clays:										
Kaolin	None									
Fireclay	None									
Bentonite	1	-	156	-	4,291	$ -	$ 4,135	1	$ 7,272	$ 4,135
Fuller's earth	4	-	625	-	17,165	$ -	$ 16,540	2	$ 7,272	$ 4,135
Ball Clay	1	-	156	-	4,291	$ -	$ 4,135	1	$ 7,272	$ 4,135
Common Clay	None									
Rock Salt/Sodium Chloride	1	-	156	-	4,291	$ -	$ 4,135	1	$ 7,272	$ 4,135
Gypsum	7	-	1,093	-	30,039	$ -	$ 28,946	4	$ 7,272	$ 4,135
Sodium Carbonate	1	-	156	-	5,670	$ -	$ 5,513	2	$ 2,225	$ 5,513
Sodium sulfate	None									
Pumice	2	-	312	-	8,583	$ -	$ 8,270	1	$ 7,272	$ 4,135
Gilsonite	None									
Talc and Pyrophyllite	None									
Boron	None									
Barite	8	-	1,290	-	34,331	$ -	$ 33,081	4	$ 8,296	$ 4,135
Fluorspar	1	-	156	-	4,291	$ -	$ 4,135	0	$ 12,671	$ 4,135
Feldspar	None									
Diatomite	None									
Perlite	None									
Vermiculite	None									
Mica	1	-	156	-	4,291	$ -	$ 4,135	0	$ 8,296	$ 4,135
Kyanite	None									
Total	332	$ -	$ 51,856	$ -	$ 1,119,842	$ -	$ 1,067,764	369	$ 2,897	$ 3,216

*Potential emission reduction associated with increased testing and monitoring (based on potential emissions from malfunctioning controls)

334 Mg/yr

3193 $/Mg

Attachment 2

Summary of Permit Review to Identify Baseline Testing and Monitoring Requirements

Attachment 2

State: Summary of State permits reviewed

General Permits

OOO fugitive emission points:	**Monitoring requirements and frequency (no. of permits)**
Wet suppression	amount of water-daily (1) inspection of water system-weekly (1) application rate (1) frequency of application (1) NS (8)
OOO affected facilities not using wet suppression (e.g., water carryover, partial enclosure)	NS (11)
Repeat M9 testing frequency*	quarterly (1) NS (10)
Other testing/monitoring requirements of interest for NSPS affected facilities	opacity testing-every 5 years (1) VE-daily (1) NS (10)
OOO stack emission points:	
Baghouses	inspect-monthly (1) pressure drop-daily or continuously (1) NS (9)
Repeat M5 testing frequency*	NS (11)
Repeat M9 testing frequency*	weekly (1) NS (10)
Other testing/monitoring requirements of interest for NSPS affected facilities (or for other dry controls used on NSPS stacks)	VE-daily (1) NS (10)

*Does not include initial tests, only repeat tests.

NS = not specified or no requirements

Attachment 2, cont.

Minor Source Permits (or unspecified permit type)

OOO fugitive emission points:	**Monitoring requirements and frequency (no. of permits)**
Wet suppression	moisture content of sand-quarterly (1) moisture content of sand-every 3rd operating day (1) moisture content- every 2 years (1) maintenance log of sprayer (1) visual checks of system-daily (1) NS (27)
OOO affected facilities not using wet suppression (e.g., water carryover, partial enclosure)	NS (32)
Repeat M9 testing frequency*	annual (4) daily (1) every 3rd operating day (1) NS (26)
Other testing/monitoring requirements of interest for NSPS affected facilities	inspections-daily (1) VE-daily (1) NS (30)
OOO stack emission points:	
Baghouses	inspect bag integrity-semiannual (3) pressure drop-daily (4) NS (25)
Repeat M5 testing frequency*	annual (1) NS (31)
Repeat M9 testing frequency*	annual (5) semiannual (1) daily (1) NS (25)
Other testing/monitoring requirements of interest for NSPS affected facilities (or for other dry controls used on NSPS stacks)	VE-daily (2) scrubber inspection-annual (1) demonstrate negative pressure of baghouse (1) NS (29)

*Does not include initial tests, only repeat tests.

NS = not specified or no requirements

Attachment 2, cont.

Major Source (Title V) Permits

OOO fugitive emission points:	**Monitoring requirements and frequency (no. of permits)**
Wet suppression	VE-weekly (1) records of amount used (2) NS (23)
OOO affected facilities not using wet suppression (e.g., water carryover, partial enclosure)	NS (26)
Repeat M9 testing frequency*	annual (1) per permit (1) monthly (2) every 2 weeks (1) quarterly (1) NS (20)
Other testing/monitoring requirements of interest for NSPS affected facilities	VE-monthly (3) VE-weekly (1) VE-daily (2) NS (20)
OOO stack emission points:	
Baghouses	pressure drop-daily (4) pressure drop-weekly (1) pressure drop-continuously (3) inspections-daily (1) inspections-quarterly (1) inspections-weekly (2) inspections-semiannual (1) VE-daily (5) VE-weekly (1) VE-monthly (1) NS (13)
Repeat M5 testing frequency*	per permit (2) annual (1) NS (23)
Repeat M9 testing frequency*	per permit (1) annual (3) quarterly (1) every 2 weeks (1) NS (20)
Other testing/monitoring requirements of interest for NSPS affected facilities (or for other dry controls used on NSPS stacks)	VE-daily (4) VE-weekly (1) NS (21)

*Does not include initial tests, only repeat tests.

NS = not specified or no requirements

Attachment 3

Bag Leak Detector Cost
Output from the EPA CEMS Cost Model

Attachment 3

Summary of CEMS

Analyzers	BEFORE	AFTER
CO	0	0
SO2	0	0
NOX	0	0
HCl	0	0
Mercury (and CO2/O2)	0	0
CO2	0	0
O2	0	0
THC	0	0
Monitors		
OPACITY	0	0
FLOW	0	0
PM (beta gauge)	0	0
PM (light scattering; insitu)	0	0
PM (light scattering; extractive)	0	0
Bag leak detector		
Number of fabric filters to be monitored=	0	1
Number of sensors=	0	1

Summary of Costs

First Costs	Labor	Test	ODCs	Total
Planning	710	0	0	710
Select Equipment	4,733	0	643	5,376
Support Facilities	0	0	665	665
Purchase CEMS Hardware	0	0	12,190	12,190
Install and Check CEMS	121	0	4,034	4,155
Performance Specification Tests	0	0	0	0
QA/QC Plan	739	0	0	739
	6,303	0	17,533	23,836
Annual Costs				
Day-to-Day Activities	2,822	0	0	2,822
Annual RATA	0	0	0	0
PM Monitor RCA	0	0	0	0
PM Monitor RRA	0	0	0	0
Cylinder Gas Audits (ACA/SVA for PM)	0	0	0	0
Recordkeeping and Reporting	168	0	0	168
Annual QA & O&M Review and Update	384	0	1,770	2,154
Capital Recovery	898	0	2,497	3,394
Total w/o capital recovery	3,374	0	1,770	5,144
Total with capital recovery	4,272	0	4,267	8,539